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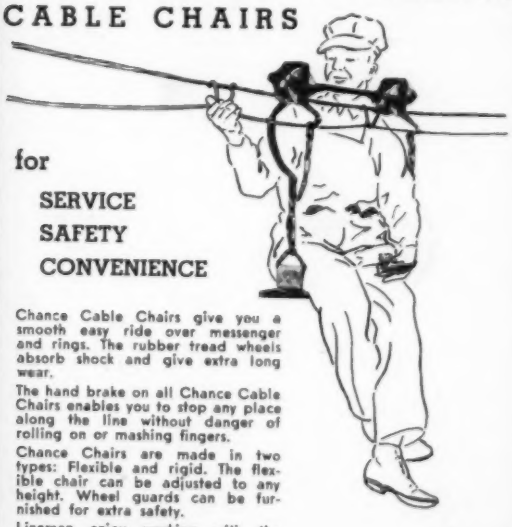

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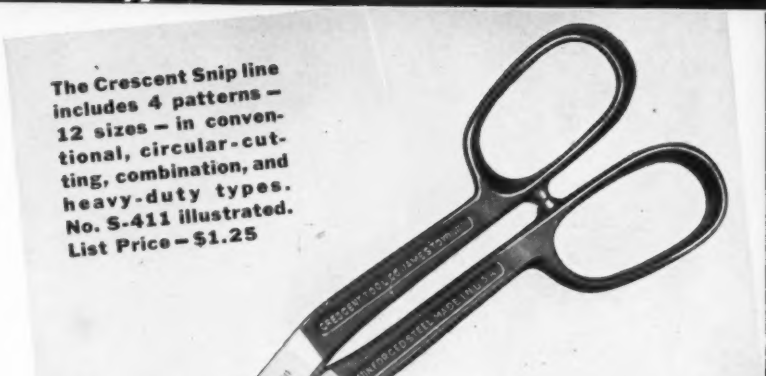

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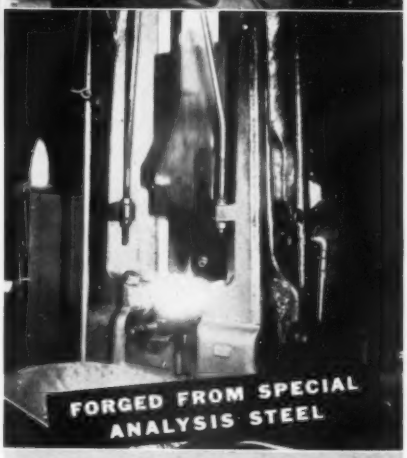

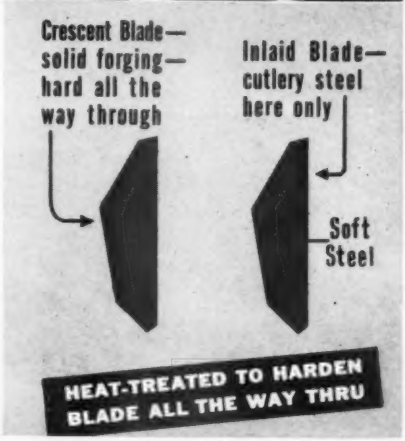

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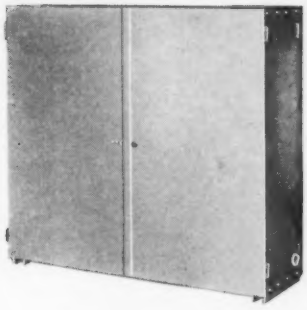

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RURAL COMMUNITY TELEPHONING ISSUE

This is the second semi-annual issue of TELEPHONY and RURAL COMMUNITY TELEPHONING. The latter publication was merged with TELEPHONY effective January 1, 1937. A combination issue of the two publications is published semi-annually in the interests of commercial telephone companies and mutually-owned rural systems.

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Telephony

SEPTEMBER 11, 1937 VOLUME 113, NUMBER 11

RURAL POLE LINE BUILDING

By RAY BLAIN

CAREFUL SELECTION of poles results in long-time economy. Native poles are often unsuited for telephone lines. Error frequently made of using larger poles than necessary and spacing them closer together than required. Suggestions for building sturdy lines that will reduce maintenance costs and furnish dependable rural service. Building to withstand sleet storms

GOOD POLES are so important in rural line construction that every effort should be made to obtain the best quality possible for each job. Good poles not only increase the expected life of the line but they also eliminate much of the trouble and expense caused by interruptions of service. Good poles will often weather a sleetstorm when inferior ones fail and a good part of a lead is leveled to the ground. Considering service over a period of years, the best poles are always the cheapest for rural line use.

Three different kinds of wood are ordinarily used for rural line poles: southern yellow pine, northern red cedar and western red cedar. Douglas fir and chestnut are also used to some extent in certain communities. All of the three main pole timbers have demonstrated their suitability for general telephone work and, when properly selected and treated, will give practically a lifetime of satisfactory service under average conditions.

Unloading Large Poles from Flat Cars. Illustration Below Shows Men at Work Roofing and Gaining Poles in the Yard.

The selection of poles by any rural telephone company is generally influenced by such factors as previous experience, cost, freight cost and the experiences of other nearby telephone companies. Since freight charges represent such a large part of the total cost of poles, carloads should always be purchased if possible. It is important, therefore, to specify quan-

tities of poles to make full railroad minimum car loadings.

Pole producers will generally roof and gain poles without additional cost, if specified in the order. It is quite important that southern yellow pine poles be roofed and gained at

Just Another Example of a Neglected Rural Telephone Line.

the plant of the supplier, for then the fresh cuts may be properly treated with creosote before shipment is made.

Two methods of classifying poles are in general use today. They are the A. S. A. dimension specification method and the top size method. The American Standards Association specifications divide poles into classes with certain dimensions and provide for specified breaking strengths and ground circumferences in some classes. The top size method specifies the diameter of the tops and the lengths of the pole. Either of these methods may be satisfactorily used in ordering poles.

Coal tar creosote is a most efficient wood preservative. This is the crude product of the destructive distillation of bituminous coal and the creosote derived from such tar proves to have the proper relationship between toxicity and solubility.

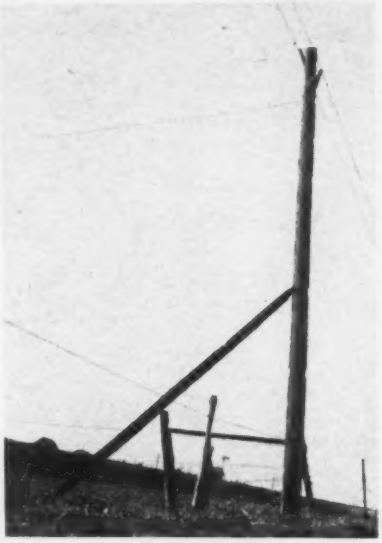
Southern yellow pine poles are treated for their entire length. It has been estimated that pine poles with an empty cell treatment of eight pounds' final retention will give service for an average of 40 years.

The tops of cedar poles do not decay to any extent. Therefore, such poles require preservative treatment only in the section extending a short distance above the ground line to the butt.

Proper treatment extends the life of any pole considerably. Tests have proved that when the average life of an untreated pole is 13 years, it can be extended to 30 years with proper treatment.

There is no doubt that false economy is often practiced in the selection of rural line poles. Many times 2-in. by 4-in. or 4-in. by 4-in. timbers will be purchased from a local lumber yard, nailed to fence posts and used to support the line wires in place of regular poles. At best this is nothing but a makeshift arrangement; it has comparatively short life and always can be expected to cause considerable trouble.

The purchase of regular poles for use on such lines would cost a few



This Is the Wrong Kind of Push Brace to Use. The Brace Should Contact the Main Pole Near the Top Where the Branch Line Takes Off the Main Lead.

dollars more at the beginning but, when considered over a term of years, would prove a much better investment than the sawed timber makeshift.

Often native poles are cut from timber not at all suited for pole use and set in rural lines. In most cases such poles are so small that they are difficult to set firmly in the ground and never stay properly lined-up under ordinary strain. These poles are also often crooked and present an unsightly appearance in the line.

Brackets and crossarms are ordinarily most difficult to mount on small native poles. Perhaps the greatest objection to the use of native poles is the fact that it is almost impossible for a lineman to work on them with climbers. The use of a ladder by linemen when working on poles of any kind is always slow and cumbersome, as well as dangerous.

Poles of a larger size than necessary are often used for rural lines. While the larger poles are entirely satisfactory, in many cases a smaller pole will do the job just as well and for considerable less money. Suppose a rural line has one bracket circuit and there is little probability of future growth; a 16-foot pole with a 4-inch top will ordinarily be adequate.

This pole in northern white cedar weighs only about 85 pounds and the cost is surprisingly low when purchased in carload lots. When for any reason a 16-foot pole does not provide sufficient clearance, an 18 or 20-foot pole can be purchased, at a slightly higher cost. A 20-foot white cedar pole with a 4-inch top weighs only about 100 pounds. Ordinarily, though, the 16-foot pole will be adequate if higher poles are used for all road crossings.

The rural pole line is ordinarily located either in or near the fence row and a line wire clearance of 2 feet above the fence tops in the center of the span will usually be satisfactory. Naturally, higher poles must be used for all gate crossings; but this will increase the total cost of the line only slightly.

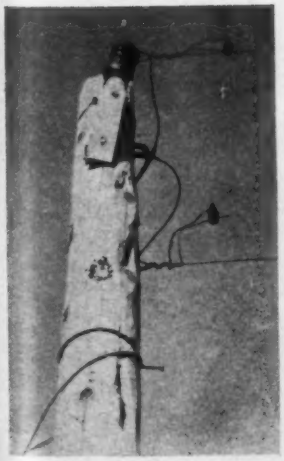
Even on a one-crossarm lead proper clearance for a horse and rider

A Horrible Example of a Native Pole. This Pole Is Entirely Too Small and Cannot Be Climbed Even with a Ladder.

will ordinarily be all that is required. Although poles need not be much longer for a crossarm lead than those necessary for a bracket line, they should be larger and stronger. This is necessary due to the increased load placed on them by the greater number of wires. A 6-inch top is the smallest to be considered for poles in

Two Rural Line Metallic Circuits on Good Cedar Poles with Butts Treated. This Is Considered an Excellent Line.

Illustration Above (Left) Shows Native Poles Cut Locally; They Are Entirely Too Small. View to Left Shows a Main Toll Lead on One Side of the Road and a One Crossarm Rural Lead on the Other; Both Are Perfect Specimens of Construction. Illustration to Right Shows Method of Deadending Rural Line Bracket Circuit and Use of Parallel Drop Wire.



To the Left Is Seen a Bracket Circuit Deadended and Drop Wire Connected to the Iron Wire with Solderless Connectors. Illustration Below Shows Method of Marking Poles in the Pole Yard with Aluminum Letters. The Letters Indicate Pole Classification. To the Right Is an Example of the Correct Spacing of Brackets on a Metallic Circuit Rural Telephone Line.

a rural crossarm lead. Usually a 7-inch top is used.

Often money is wasted in spacing poles much closer than is actually necessary on rural lines. Line wire of greater strength and longer pole spans have been used to advantage by many companies in recent years. When line wires of sufficient strength are used and not over four wires are strung, poles may ordinarily be set 20 to the mile with spans of 260 feet. The pole spacing, of course, will be controlled to a certain extent by local conditions.

Shorter spans must, naturally, be used around curves and in clearing all obstructions. In heavy sleet areas it may be considered desirable to reduce the spans to 150 feet, or even less in some extreme cases. In light sleet areas or in the south where sleet is unknown, even a 300-foot span may be used with entire satisfaction.

When a rural line parallels a toll line, in some cases contacts may be leased from the toll company at a cost much less than that required to maintain a separate pole line. Parallel pole lines on one side of a road are usually objectionable, due to the fact that proper clearance between them is difficult to obtain.

The practice of placing telephone circuits on power line poles is not ordinarily considered desirable due to the likelihood of inductive disturbances and also accidental contact between the electric and telephone wires. However, this has been done with fair success when the power circuits do not carry over 2,300 volts and telephone circuits are metallic and well transposed.

When a rural line crosses a power line at right angles, every effort should be made to obtain maximum clearance. When possible, power lines should pass over rather than under all telephone lines.

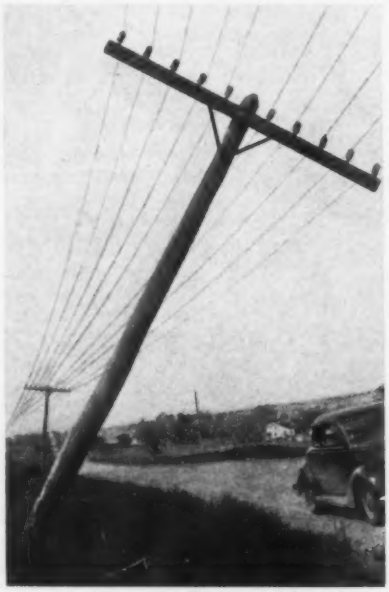
Being much larger, the conductors of the power lines have greater mechanical strength than the smaller conductors of the telephone line and are not as likely to break and cause accidental contact. Even though the power line has been placed first, it will frequently prove advantageous to have it raised so that the telephone line may pass under it.

When telephone and power leads must parallel for any distance, it is best that they be separated as much as possible—at least by the width of the highway.

Heavier poles should be used for corners, road crossings or other locations where extra strain may be sustained by the line. All corner poles and those used on crossings should be guyed properly.

Storm-guying is generally considered necessary in heavy sleet areas. The use of shorter poles adds considerable to the safety of all lines and is especially desirable in sleet areas. This practice reduces the cost of storm-guying considerably.

Some telephone men buy good poles but make the mistake of not setting them to the required depth. The 16-foot poles should be set in the earth to a depth of at least 3½ feet and the 20-foot length to a depth of four feet. Crossing poles are generally about 25 feet in length and should be set to a depth of five feet. Poles 30 feet in length should be set to a depth of 5½ feet.



An Unbanked Pole That Was Weakened by Fire to Such an Extent That It Broke at the Ground Level.

The earth should always be well tamped around the poles. When not set to the proper depth or not tamped sufficiently, poles cannot be expected to hold their position in the line under service strain.

Tree attachments on rural lines should always be avoided if possible. Trees ordinarily move around considerably more than a pole in the wind and this places unnecessary strain on the line. It is even better to set two poles, if necessary, to avoid one tree attachment. This practice also often eliminates the necessity for expensive tree trimming.

In sections of the country where lightning is prevalent, it is generally considered desirable to place a ground wire on at least two equally-spaced poles in each mile of line. This wire should extend from the roof to the butt of the pole and should be placed before setting. It should be bare iron wire, stapled in place. This precaution often avoids excessive splitting of poles when lightning discharges to the line and then to ground.

Even the best constructed line should be gone over at least once each year and necessary repairs made. Leaning poles should be straightened and retamped. All poles in the country should be kept well banked and all dry grass and brush removed from the bases to avoid possible destruction of poles by fire.

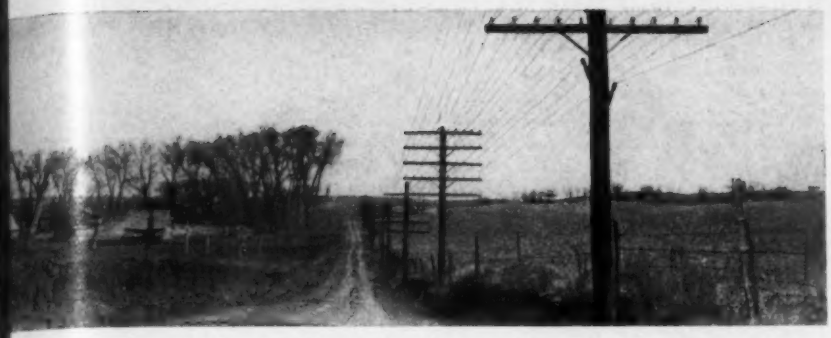
Ordinarily, this yearly overhaul can be accomplished in the fall so that all dead grass may be removed before winter starts and fire trouble is likely. This practice also places the line in good condition to care for the extra strain of winter storms and temperature changes.

Some companies keep a reserve of poles in their yards which are available for instant use in case of trouble. This is a good practice, for there are no means of foretelling when fire, storms or a wild automobile will make the replacement of a pole immediately necessary. When trouble happens, and a new pole is not available, an old pole must either be reset or stubbed. In view of the present low cost of poles, stubbing of any pole is not recommended as an efficient practice.

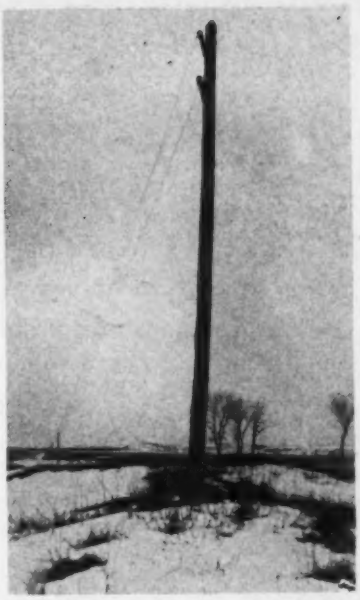
When a reserve supply is kept in the yard for repairs, the poles should be elevated and stored in such a manner that moisture will not be retained to start decay. It is believed desirable to mark and classify all poles in the yard if two or more different kinds are stocked.

Some companies make use of aluminum letters nailed to the butts of poles for this class designation. When this practice is observed, a truck driver may be sent to the yard to pick up a pole of a certain marking without fear that a mistake will be made and the wrong type of pole selected by him.

On driving through the country one can usually tell from the general appearance of telephone lines which ones have excessive trouble upon them and which are giving good service and, perhaps, making money for their owners. It is utterly impossible to maintain open wire lines and give good service at a reasonable cost, unless good supporting poles are used. We believe that those contemplating rural line construction should make every effort to obtain the best poles possible suited to their needs.

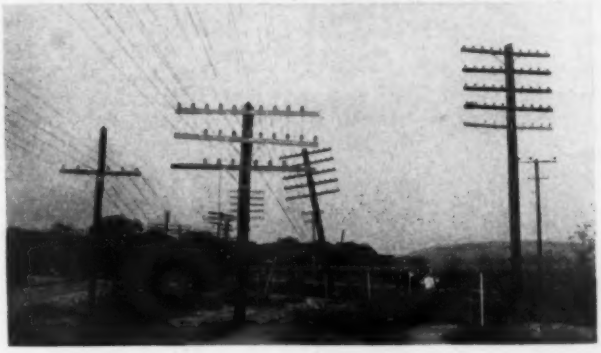


A Rural Line Placed on Brackets on Poles of a Toll Line. Contacts on the Poles Are Rented from the Toll Line Company.



A Rural Telephone Line on Brackets with Good Poles.

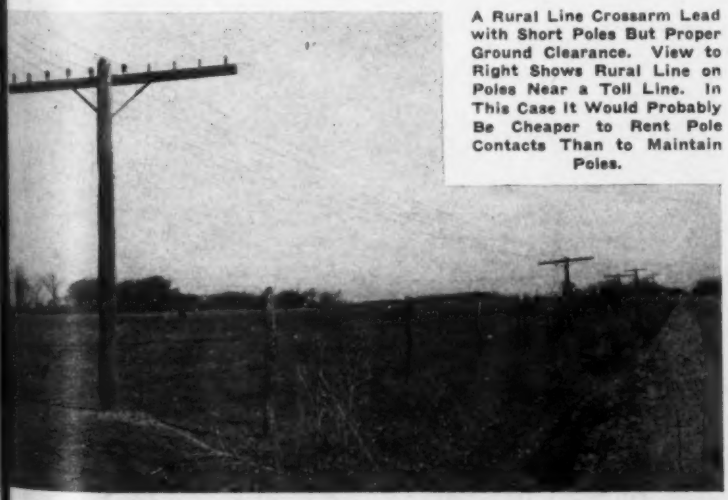
Four Different Pole Lines Running Parallel and Close Together So That Proper Clearance is Impossible.

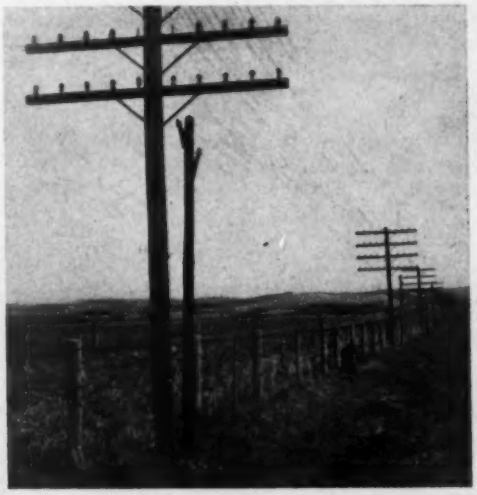


A Common Present-Day Situation: A Grounded Rural Electric Line on One Side of the Highway and a Telephone Line on the Other

Ample Clearance Should Always Be Obtained When a Rural Line Passes at Right Angles to a Power Line. The Latter Should Pass Over Telephone Line If It Is Possible to Do So.

A Rural Line Crossarm Lead with Short Poles But Proper Ground Clearance. View to Right Shows Rural Line on Poles Near a Toll Line. In This Case It Would Probably Be Cheaper to Rent Pole Contacts Than to Maintain Poles.





Insulation of Rural Lines Is Important

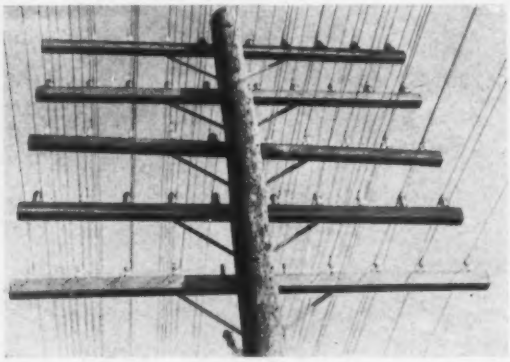
By EDWARD BENTON

A FREQUENTLY-NEGLECTED phase of rural line construction and maintenance is proper insulation. Failure to appreciate its importance is one of the main sources of transmission losses on rural lines. Steps to take in improving rural line insulation

A Case of Neglected Insulation. Needless to Say, These Lines Do Not Give Good Service to Subscribers.

PERHAPS the one thing most neglected in the original wiring and subsequent maintenance of rural lines is the proper insulation of the circuit conductors. Insulation in the sense referred to here means the support of the line wires with some non-conducting materials, to provide a path over them for the non-obstructed flow of the delicate voice-frequency currents.

In most cases the consideration of proper insulation is not neglected intentionally; its importance is simply underestimated. As one troubleman asked me, recently: "Why should a high resistance ground on one side of a metallic circuit be so important when we formerly used the solid ground connection as one side of the circuit?"



A Specimen of Perfect Insulation. A Toll Line Pole with Perfect Insulators in Place on Every Pin and Each Wire Tied Firmly in Place.

This is all true if only one or more small grounds were on one side of the circuit. This is seldom, if ever, a fact in actual practice, however, as a carelessly-maintained line will generally have slight grounds on both sides which will form a partial short-circuit across the line and result in a loss of transmission.

The modern carbon granule transmitter, when properly used in a standard telephone circuit and when acted upon by its diaphragm and sound waves of the voice, will ordinarily generate enough alternating current at voice frequency to carry over a properly-designed rural line and to vibrate the diaphragm of a receiver and generate sound waves to strike the ear drum and reproduce the voice.

When an attempt is made to transmit this current over an improperly-designed or constructed line, it will gradually leak away and will be so weak upon reaching the receiver that the diaphragm will vibrate weakly, if at all, and very feeble sound waves will be generated.

Multiple high resistance grounds, caused by low line insulation resistance, are the cause of the greatest current loss and unsatisfactory transmission on rural lines.

The more complicated factors of transmission, such as attenuation, reflection loss, capacitance and inductance need not ordinarily enter into the problems of a properly-constructed and maintained rural line, due to their comparatively short average length. Neither are the various complicated tests of rural line insulation resistance—measured by means of a Wheatstone bridge, voltmeter, or megger — ordinarily considered a necessity in the furnishing of good telephone service.

The best practice, in our opinion, is to cut a condenser in series with the ringer of each subscriber's station. Then, when the line is clear, a test from the central office end with a wire chief's test set will give a clear capacity kick on the voltmeter.

Ordinarily, the wire chief's test set should be equipped with a 10,000-ohm voltmeter, although worthwhile tests can be made with meters of considerably less resistance. When all stations on a line are equipped with condensers it is a simple matter to test the line each morning, and any trouble will thus be immediately detected. A good wire chief's test set is comparatively inexpensive and no telephone company can well afford to be without one.

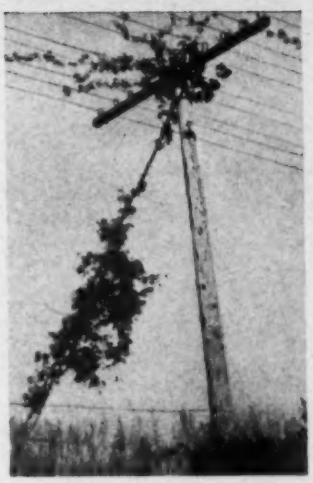
Some telephone companies make the sad mistake of using the wrong type of insulator when rural lines are constructed. In some cases knobs are used because the first cost is a few cents less than that of good glass insulators. Knobs are quite satisfactory on jobs for which they were designed; but they are not usually satisfactory for supporting the line wire, as they do not have sufficient surface to make a good line insulator in all kinds of weather. Knobs are ordinarily used only for supporting drop wire on buildings.

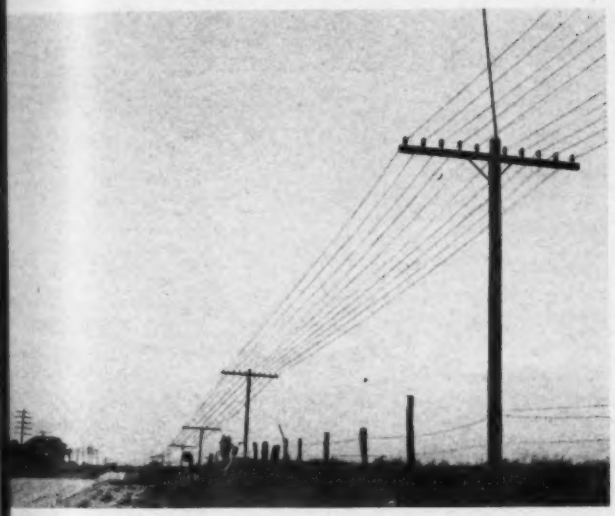
The single, or double groove, No. 5 pony glass insulator is generally considered very good for rural line use. The double groove has the advantage that it provides a space for deadending drops that break off the line. The single groove pony insulator weighs nine ounces and the double groove about ten ounces.

The double petticoat insulator should be used on long or important lines, as it has more surface and, therefore, gives much better insulation. The inner petticoat being sheltered and dry gives better wet weather insulation. This insulator weighs about 24 ounces.

Modern insulators are made of a new and improved type of colorless glass which is non-porous and possesses high dialectric strength. It is

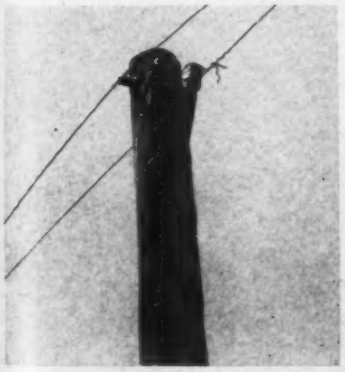
A Short Pole with Crossarms Takes Line Under Rather Than Over Trees. This Method Eliminates Practically All Tree Trimming and Still Provides Clearance; It Is Believed Satisfactory in This Location. Illustration to Right Shows That While Flowers May Be a Joy Forever to Some People, in Instances Such as This They Are Far from Being a Joy to the Maintenance Man, as They Provide Paths for Leaks to Ground on All Lines.



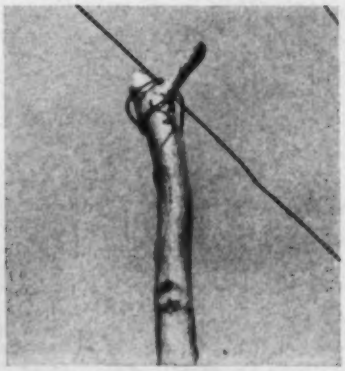


An Extension to the Regular Line Pole, Used to Elevate a Drop Wire Sufficiently to Provide Proper Clearance Across a Main Highway or the Entrance to Farm House or to a Field.

These Trees Were Trimmed Last Year But Proper Clearance Was Not Provided. In This and Similar Locations They Should Be Trimmed at Least Twice a Year.



Ordinary Porcelain Knob Used to Support a Line Wire on a Rural Line. This Type Insulator Does Not Have Enough Surface to Provide Proper Insulation of the Line from Ground on Poles, Especially in Damp Weather.



To Left Is Badly Neglected Line Which Will Have to Be Entirely Rebuilt. Above Is Another Example of Neglected Insulation, the Line Wire Being Tied to the Pole without a Sign of an Insulator.

also tougher and less affected by sudden temperature changes than former kinds of green and blue-colored glass. In recent years insulators have been redesigned. They now have extra strength built into them; all sharp corners have been eliminated and special attention has been given to the shape and thickness of petticoats with distribution of mass in the body of each insulator.

The old style, green-tint insulator and the still older dark green or blue insulator were colored by impurities in the glass itself. With the perfection of modern methods, manufacturers are now able to produce colorless glass which is superior mechanically, electrically and in general serviceability.

Under green insulators, spiders often weave webbs, which become moisture laden in rainy weather and cause a leak to ground. The difficulty is eliminated with clear glass insulators, for spiders will not weave webbs under them due to the unobstructed passage of light.

Porcelain knobs can be obtained in one, two or four grooves. The two-piece, or clamping knob is often used for deadending a drop on a building before it enters the tube through the wall. The four-groove knob was designed for use with twisted-pair drop wire and should be attached to a pole with mounting brackets. The bridle wire insulator consists of a tubular tip riveted to a cap formed over a bead on a glass tube flared at the lower end.

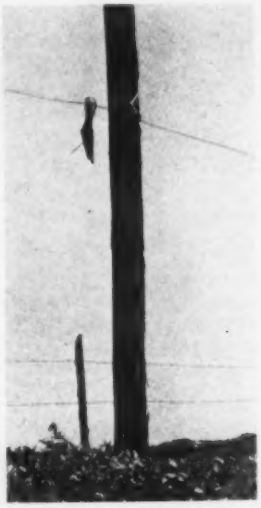
This insulator is for use whenever a dry connection between a bare wire and an insulated wire is necessary to prevent leakage over and around the insulation. Many companies use this type insulator, when bridling important open-wire circuits, to prevent leakage.

Some telephone companies make the sad mistake of using old, cracked or broken glass insulators. A cracked or chipped insulator of any kind should always be considered a bad insulator and destroyed. Many also make use of old, battered broken and porous porcelain knobs which are about as effective as an insulator as a sponge would be.

Chipped or broken glass insulators are always dangerous, as they are likely to seriously cut the hands of workmen. It will always prove much cheaper in the long run to destroy a defective insulator than to make any attempt to use it.

Trees are undoubtedly the greatest enemy of good insulation on all rural lines. Trimming trees to provide adequate clearance, if possible at all, is generally expensive. For this reason trees should be avoided so far as possible, when laying out the line, even at the expense of additional corners. Sometimes, however, a lead must be placed on the same side of the road with a row of trees. In such a case poles of a type to provide maximum clearance should be used. Sometimes extra high poles are necessary to go over the trees or to elevate the lines so that only minimum trimming will be necessary.

A new scheme is being tried out in one locality where large trees were encountered. It is the setting of low poles and extending circuits *under* all limbs and foliage. This does not provide much ground clearance but, as



Sometimes a Wire Is Tied to a Pole with Harvester or Binder Twine.

the line under the trees is in a more or less sheltered location, it is generally considered adequate. There is one apparent defect with this type of tree clearance in that the line is exposed to falling limbs. This is true though, to a certain extent, of any line located near trees.

All rural lines should be inspected at least once each year, to trim all limbs—no matter how small they may be—which may possibly come into contact with the line wires. Limbs extending over the line which are liable to sag during wet weather and contact the circuit, should likewise be removed. Green foliage or wet tree limbs touching line wires is one of the most serious causes of low line insulation resistance.

When it is impossible to clear trees by trimming or otherwise, a specially insulated tree wire may be used. This is not ordinarily considered good practice for it introduces extra splices into the line; also the insulation of the wire being in constant contact with the swaying trees, wears and the insulation resistance of the wire becomes gradually lower. The newly-developed buried type rural wire may prove a life-saver for clearing trees which it is impossible to avoid with aerial lines.

One can drive through the country in almost any locality and view countless cases of poor insulation on practically all rural lines. As stated previously, the greatest number of faults will generally be due to trees, although this is not by any means the only one.

A tie wire is broken and a line wire is lying on a crossarm or pole bracket; a bracket may be pulled loose and the wire resting against the pole, these faults may not cause trouble in dry, sunshiny weather but when everything is wet they most surely form a high resistance leak to ground. Often line wires themselves become so slack that they contact fence wire or posts, and this can be a serious fault, even in dry weather.

One serious fault and frequent cause of low insulation resistance is dirty carbon blocks in the station lightning arresters. Carbon blocks or discharge blocks should be cleaned or replaced immediately after each severe electrical storm. Some companies have adopted the practice of keeping extra sets of sealed, unit type, discharge blocks at each subscriber's station on its rural lines and instructing the subscriber how to change them when called upon to do so.

Another common rural line fault is that of placing the line and ground wires through the same tube or hole into a house. If the outer end is not sealed, moisture may collect in the tube, causing a deterioration of the rubber insulation of the wires and a leak to ground with its accompanying transmission loss. Frequently twisted pair wire is tacked along the outside of a building, and this may cause serious transmission losses in wet weather.

Some may claim that the care suggested here to keep lines properly insulated is not necessary but we have learned from years of operation and observation that this special care in the maintenance of rural lines is well worth while.

Down South some years ago some farmers had no end of trouble with their privately-owned line of about 15 stations. We switched for them and they were supposed to maintain it themselves. They could barely talk in dry weather and the line was

(*Please turn to page* 43)

Going Modern? How One Company Did It

By L. M. LAMKINS

INSTALLATION OF common battery equipment in locally-owned exchange at Manawa, Wis., has resulted in greater service satisfaction, added subscribers and increased traffic. No opposition to higher rates for new service raised by the 400 subscribers. View at top of page shows side and rear views of new exchange, with two-car garage at end of lot, ideally located one block from the main street. View at bottom shows new central office

THIS YEAR an important milestone was passed in the history of the Manawa Telephone Co., of Manawa, Wis., with the installation and cutting into service on April 1 of a new two-position, common battery multiple switchboard. Since 1911 this village of 750 had been served by a single supervision magneto switchboard of 120-line capacity. In 1926 the single position became too small and a second position, a board of like type, was added, giving an additional capacity of 25 lines.

The Manawa Telephone Co. serves a rural territory some 12 miles square in almost the exact center of Waupaca county, comprising some of the best farming country in the state. Over this board we handled 27 rural party lines and 102 local lines, as well as seven toll lines and two toll trunks.

In 1932 we added Postal Telegraph to our facilities and, a couple of years later, Western Union, giving us pretty complete coverage in the communications field. We found that the added facilities, which made a material contribution to the convenience of our subscribers, in no way reduced our toll revenues; on the contrary, they gave us additional revenue.

In looking about for ways to make our service more indispensable to its users, during the dark years of the depression, we devised the "Rural Broadcast" which later became of somewhat general use throughout the state. In spite of claims of others to be the first to use this service, we think the record will bear us out that the idea originated with us. We have never overdone it and have carefully avoided commercializing it. We broadcast only items in the public interest and have found that the service is of great value to our subscribers.

During this period we also completely overhauled our rural substation equipment, removing all telephones having a shabby or old-fashioned appearance and substituting refinished

instruments which had been carefully tested in our shop. For this purpose we purchased one of the new Shallcross service meters which we found to be of inestimable value.

Thus we came to the year 1936 with a good cable and wire plant and rural substation equipment in good shape. Our switchboard, on the contrary, was an increasing maintenance problem, in addition to being overloaded and inadequate to handle our increasing traffic load.

Our local substation equipment was also, in the case of a majority of the installations, of obsolete type and pretty well depreciated. We had a large proportion of desk telephones that had been in service for many years and we felt that they were a poor advertisement of our business.

The question then confronted us as to our future policy. In canvassing the situation throughout the industry we found two schools of thought. One group felt that magneto service was still the tops for the small community. The other group, composed generally of companies that operated several exchanges, leaned to the several types of dial equipment.

With dial installations in neighboring communities, there was a demand among some of our subscribers for more modern telephone service. After visiting several exchanges we decided to find out how extensive this demand was.

Being a one-exchange company which handled a lot of local toll business as well as telegraph, machine switching did not seem to solve our problem. Our rural plant was in excellent condition. The rural broadcast had become a popular feature of our rural service.

We preferred to handle our own toll business and also our collections which necessitated our keeping an operator on duty 24 hours a day. Obviously machine switching would effect no great economies for us.

Subscribers Favor Service Change, With New Rates

It was, therefore, decided to leave the rural lines magneto and thus absorb the best of our local telephones which were adaptable for that purpose. We canvassed all of the local subscribers and found that 80 per cent of them were in favor of common battery manual service and willing to pay 35 cents more than their present monthly rates to get it.

The remaining 20 per cent (bless their hearts) said they were getting excellent service as it was and they were satisfied; but if the majority signed up for the new service, they would go along with the rest.

That canvass was a liberal education. It is the belief of the writer who did the canvassing that every business would find such a canvass a paying investment. We asked each subscriber to tell us frankly *what they did not like* about the service they were then getting, also what they would like to have.

We carried with us samples of the several types of common battery telephones. As most of our existing telephones were Kellogg's, it was decided to standardize on that type of equipment, and the two types of handset proved so popular that we decided to eliminate the desk type of equipment entirely from our new plant, as far as the common battery section was concerned.

Two-Position Common Battery Board Installed

From the data compiled in our canvass we decided to install a feature common battery switchboard and contracted with the Stromberg-Carlson Telephone Mfg. Co. for a two-position, junior multiple board. The new equipment incorporates such features as machine synchronic ringing, flash recall, revertive ringing tone, instantaneous generator cutoff, secret service and, of course, double lamp supervision.

Our rural section was equipped with lamp signals as well as the toll section. A master key was to be provided for ringing manually when needed, as well as for the code ringing on rural lines.

All cord circuits were to be of the universal type. Provisions were also to be made for the installation of a dial with a switching key, so that it could be operated on each of two automatic toll lines to neighboring automatic exchanges where we ring their subscribers direct.

At this stage of the proceedings we found that we needed more room. Not being able to secure it in existing quarters and a site being available in an ideal location one block from the main street and our main cable leads, we began to seriously consider the erection of a new building. As the telephone company was not in a position to handle the additional investment, the writer decided to construct the building upon obtaining a satisfactory lease from the company.

The site was formerly occupied by a modern residence which had been sold to a farmer. He had promptly moved it onto his farm, leaving the foundation, basement, well, sewage arrangements, landscaping and a two-car garage. The writer drew a plan utilizing the foundation exactly as it stood, with the results as shown in the illustration at the head of this article.

The building was a success from the start. Civic pride was gratified to have an eyesore converted into a thing of beauty and utility, and keen interest was displayed in every stage of the construction of the new building. All local materials and labor were used, the company thus doing its bit to break the local depression.

The building is of solid brick construction: the outside of vari-colored tapestry brick and the inside of insulation brick, back plastered. The roof is of Johns-Manville asbestos shingles in green. All-copper flashings and valleys were used and the gutters and downspouts are of a new type, painted first with one coat of aluminized asphalt and then with two coats of white paint to harmonize with the cornice.

The interior walls are finished with NU-Wood planks tinted in rose, gray and green, with a buff wainscot and chair rail. The ceilings are of the same material in cream and gray in an attractive tile pattern. This was applied over solid wood sheathing to eliminate the possibility of any sag. This material affords remarkable sound-deadening properties as well as acting as insulation. Its beauty has attracted considerable comment as well as visitors.

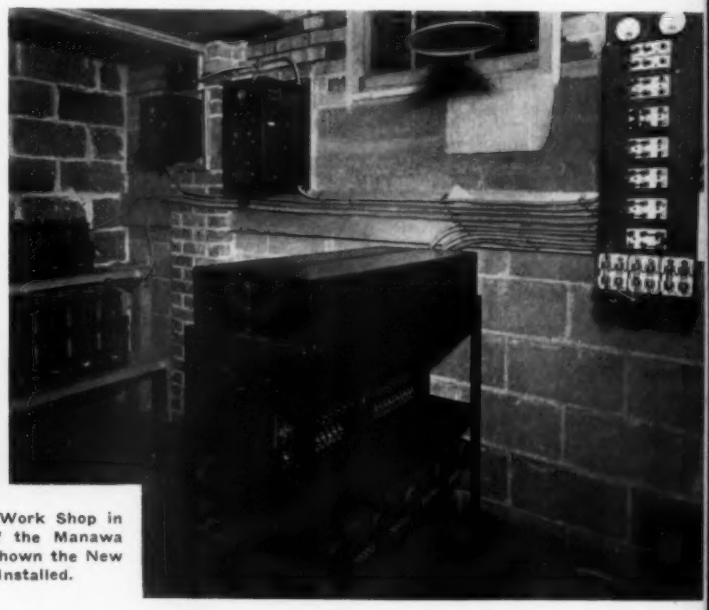
Pale Green Venetian Shades Add Beauty

Windows and doors have no casings, a narrow back band being used instead to give a modern effect. Venetian blinds of pale green add to the attractiveness of the main rooms. The windows are "chair high" so that the wainscot comes even with the bottom of the sill. This is important in an office as it gives more light and does not cut up the wall space.

The floors are of Johns-Manville asphalt tile over wood underflooring. The colors are black with a stippling effect alternating green and gray and emphasizing the tile pattern. The cement basement floor is painted with Medusa floor covering, a paint composed largely of ground crepe rubber.

The walls of the lavatory are also covered with this paint up as high as the small window. It is very smooth and its dark gray color simplifies cleaning. It does not

The Attractive New Building (Left) of the Manawa (Wis.) Telephone Co. Is Surrounded by Beautiful Shrubbery and a Neatly-Kept Lawn. Right View Shows the Lobby of the New Exchange Building, With a Telephone Booth for Use of the Public. Note That the Handset Is Provided for Convenient Telephoning While Sitting.



Left View Shows the Basement Work Shop in the Manawa, Wis., Exchange of the Manawa Telephone Co. On the Right Is Shown the New Power Equipment Recently Installed.

View of General Office of Manawa, Wis., Exchange. On the Right Manager L. M. Lamkins is Telephoning From His New Office.

show splashes and is easily cleaned with a damp cloth.

The baseboards as well as the floor of the lavatory are of cement to which a coloring has been added to harmonize with the floor. They were then treated with Truscon wax.

The heating plant is an automatic oil burner with an air filter and blower, used during the summer months to cool the building. A switch located near the switchboard enables the operator to control the fan. As the lot is bounded on four sides by streets or alleys, the fuel oil is fed to the storage tank in the basement through an underground pipe which comes up in the hedge separating the lot from the alley.

Upon entering the front door of the exchange building one finds himself in a lobby eight feet wide and 17 feet in length. This lobby, by the way, is open 24 hours a day. Stationed on a desk is a unique seven-watt night light constructed from an old desk telephone. This gives the late customer enough light to see to turn on the large opal dome light, in case he wishes to write.

A small window with a sliding panel on which is lettered the word "Rap," gives him a chance to pay a bill, obtain change, or hand in a telegram at any time of night. The window is too small for him to see much or to annoy the night operator, and the sliding panel is operated from within by the operator. It is so arranged that a persistent annoyer may get a smart rap on the knuckles.

The lobby is also equipped with a large built-in telephone booth and an arm chair, in addition to the desk previously mentioned. The telephone in the booth is of the handset, coin-collector type which enables the user to sit down and relax while telephoning or to write in comfort on the shelf provided for the purpose.

The booth is ventilated by means of a Bon-Air ventilator which, together with the bracket light, is operated by an automatic switch that closes when the door is closed and opens when it is opened. This ventilating unit draws fresh air from the operating room which is the coolest room in the building in summer and the warmest in winter. The stale air is exhausted into the attic. The traveling men say "it's an oasis."

From the lobby one passes into the operating room where a waist-high counter with a gate equipped with a blind latch, separates him from the operator. The switchboard is located near the gate so that the cord length of the operator's head-set permits her to come to the counter to wait on customers desiring to pay bills or seeking information of various kinds.

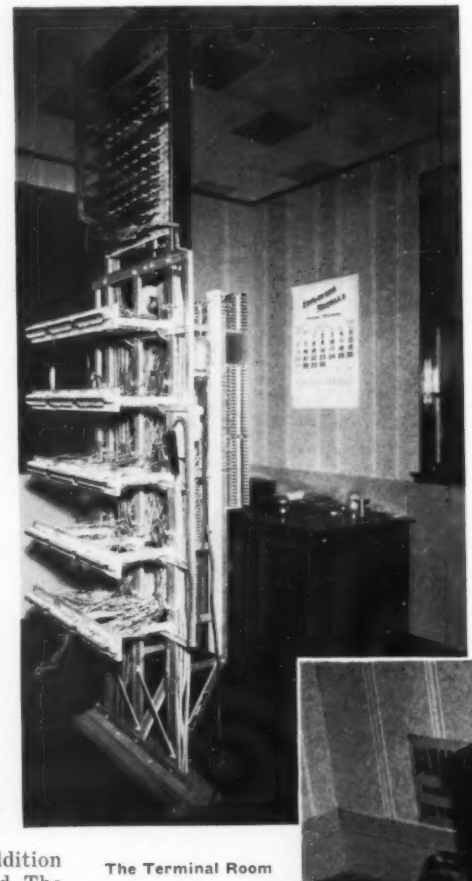
The night operator's bed is a new studio upholstered couch in maroon. Equipped with double rubber casters, it rolls easily and silently into place without marking the floor. The night operator is provided with a handset instead of the conventional type of operator's headset. This not only eliminates trouble for her but also the source of some mysterious clanking sometimes heard when making a night call in a small exchange.

Under the counter is storage space for extra bedding for the night operator, as well as the toll tickets, telegraph blanks and all the paper adjuncts of her job. Each operator has a drawer under the counter in which to keep her head-set and personal effects. Pigeon holes and a drawer for pencils and miscellanous articles are installed in the face of the left-hand position, for ready use.

A wire chief's test panel is mounted flush with the face of the other position, so that the operator may test with the troubleman at any time. No patching cords are used on phantom lines as in the old board; in and out jacks are used in their place.

We have two rural pay stations which used to ring in grounded to two 2500-ohm bells. These are now terminated on two separate lamp signals and a rare gas relay is used to take the resultant ground off the rural line, except when the pay station is actually ringing Central.

Postal Telegraph has provided us with a 15-inch electric clock that hangs directly above the switch-



The Terminal Room of the Manawa, Wis., Telephone Exchange Is Shown in the Illustration Above. On the Right Is a Close-up View of the New Stromberg-Carlson Common Battery Switchboard, With Margaret Hahn, Night Operator, Handling the Calls.

board, thus enabling the operator to give subscribers accurate time service at all times.

At the right as one turns from the counter is the door to the general office. This office is 20 feet long and as will be observed from one of the illustrations, gives us ample room for all our commercial work. The windows over the work table give us a north light. They are placed high enough so that events outside will not distract the workers' attention.

Most of the furniture in the general office was obtained from the directors' room of a defunct bank; this gives our furnishings a somewhat luxurious appearance but does not add unduly to the investment in general office equipment.

Restroom Facilities Include a Day Bed

Next to the main office to the right is a small restroom with a day bed, arm chair and mirror. Opening off this room is the lavatory and toilet. The latter facilities are certainly appreciated by our staff, after working in a second story office without the benefit of running water.

Emerging from this restroom, you encounter our pride and joy. Yes, sir, it's a drinking fountain! Fresh water all the time. Have one on the house! The photographer missed this important feature, but it is located at the end of the counter and is handy to the operators and also to the public.

Next comes the terminal room, complete with a chair and desk for our proud troubleman. The back of the switchboard opens into this room, and all day long it hums to the chuckle of relays. All cables run beneath the floor.

The house cable goes straight up along the main frame and the fanning strips for all house telephones, as well as the toll lines, are in the attic. By the way, this attic is a roomy place, easily reached by a built-in steel ladder back of the door in the restroom.

All phantom coils are mounted on the main distributing frame. There is nothing on the walls of the terminal room but the calendar. A convenience electric outlet is provided on the main frame for a soldering iron and a portable extension light; a neon tell-tale lamp advises us when the iron is on. All right, we'll tell you; it's a Cook main frame. Don't get commercial!

From here we pass down a short flight of steps to the grade entrance that goes out to the garage. Three-way switches light the way if it is dark. There's a yard light up under the cornice. Out there is our two-car garage, with its separate toilet facilities for the plant men, and bins for all line material. "A place for everything and everything in its place" is our motto.

But come on downstairs. It still looks rather tacky, as we haven't quite settled down yet, but some kind of order is appearing. One of the accompanying illustrations will give you some kind of an idea as to what we intend to do. We intend to have a line shaft over the work bench so that we can have grinders and polishing heads and maybe a lathe.

Through the glass door at the left we come to the power room. We are proud of this job as we did it all ourselves. All wiring, you will note, is in BX. Where we needed a six-wire cable we pulled out the insides of the BX and pulled in two strands of three-conductor No. 19 interior wire, thus achieving uniformity and protection in one operation.

The business on legs is the ringing machine, or rather machines, as the two are mounted together. These are two exact duplicates. A switch on the power panel enables the attendant to switch from one to the other when necessary.

The outside cable from the main street back to the office is of the armoured steel tape variety and is buried about 2½ feet. Although we offered the Bell the use of our cable, they preferred to use the new "U" wire which they laid in the trench along with our cable. Their protectors and coils are all mounted on a panel alongside of the underground entrance; from there they extend up the cross connecting rack to our house cable in the attic, over No. 19 jumper wire.

Effect on Subscribers of New Instruments

While installing the new telephones, we replaced all drop and house wiring that appeared in the least doubtful. As a result we have had very little trouble with insulation breakdowns. We have no unsightly protectors mounted on inside walls in residences, having replaced all of these with the Cook "07" outside mounting arresters. Our canvass revealed that the ladies objected to "those dirty things."

We found our people about equally divided as to choice of the desk and wall type of handset. As long as we were rewiring most of the places, anyway, we put the new instruments wherever the subscribers wanted them, at no extra charge.

We went into consultation with each subscriber as to the best location and the type of instrument best suited for his needs. In some cases we persuaded the user to rearrange his equipment for more efficient use. This sounds like a lot of nerve; but our suggestions couldn't have been so crazy because, almost without exception, the customers adopted them and have expressed themselves as being quite satisfied with the results.

For example, in a barber shop we suggested a wall handset mounted under the accessory shelf with a 10-foot cord, so a customer could take a call without getting out of the chair. The proprietor has since painted his shop inside and out and modernized it to a considerable extent. He said he had *to live up to his telephone.*

Handsets Become Standard Equipment With New Rates

The writer read an item in TELEPHONY, stating that the Manawa Telephone Co. is the first exchange in the state to furnish handsets at no extra charge. That is not quite accurate. True, we have no differential between wall telephones and handsets in our common battery plant.

We asked the state public service commission for an increase of 35 cents and 10 cents on all handset telephones and got 40 cents on residence and 50 cents on business, the type of telephone being optional. The only result has been that we have now eliminated the rest of the wall telephones, for when a subscriber has to pay for a handset anyway, there is no object in having a wall telephone.

In our office we have telephones in every conceivable place. We have two table-type handsets in the general office, one in the terminal room, a wall type handset in the basement and another in the garage. We figure that if we do not use our own facilities abundantly and efficiently, we are in a poor position to sell them to anyone else. Of course, all our employes have telephones in their homes; the writer has three.

We have been in our new quarters now five months and satisfaction seems to be quite universal. We have added subcribers and increased our traffic. Our aim has been to make telephone service as easy and pleasant to use as possible. "The proof of the pudding is in the eating thereof."

Wiring Rural Line Telephone Stations

By JOHN GRANT

DEPENDABLE SERVICE and low maintenance costs depend in considerable measure upon care exercised in wiring of rural line stations. Some practical suggestions for making a first-class job of a substation installation in a country home. Illustration to right shows rural line properly connected where it joins the terminal of an underground cable

CARELESSNESS in the wiring of rural line stations often makes necessary expensive trips for the troubleman later. Therefore, the installer should be equipped with adequate tools and material, in the first place, if he is to be expected to do a first class job. Tools must also be kept in good condition, for a dull bit will often waste its worth in time lost during one day. Many also make the sad mistake of attempting to obtain a good job with makeshift materials.

In rural line station installation, like in everything else, the best is always the cheapest in the long run. Extreme care should always be exercised to make sure that all connections are good, both electrically and mechanically. All fixtures should also be securely mounted with screws or anchors to prevent their loosening later.

When starting a rural-line station installation the wire run from the line to the house, commonly called the "drop," should receive first consideration. This drop at the present time is generally run with either twisted pair or the comparatively new parallel type wire. Iron wire, pulled tight and attached to a house in any manner, usually causes annoying humming.

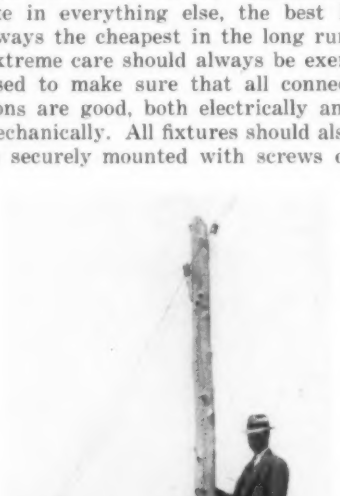
When twisted-pair wire is used, it is often deadended on one groove of the insulator which supports the line wire on the pole where the drop is attached. This arrangement may be used on either a bracket line or a crossarm.

In many cases it is necessary to elevate the drop where it leaves the main line in order to clear a road. When this is necessary it is usually possible to construct an extension out of angle iron or wood and install it on the pole to provide the extra height on the pole for the drop. Ready-made extensions which will be found ideal for this purpose can be purchased from leading telephone supply houses.

When parallel drop wire is used, drop wire clamps are recommended for both deadend and intermediate ties. These clamps make a good job and are easily and quickly installed. These clamps may be attached to the line pole with a galvanized drive hook.

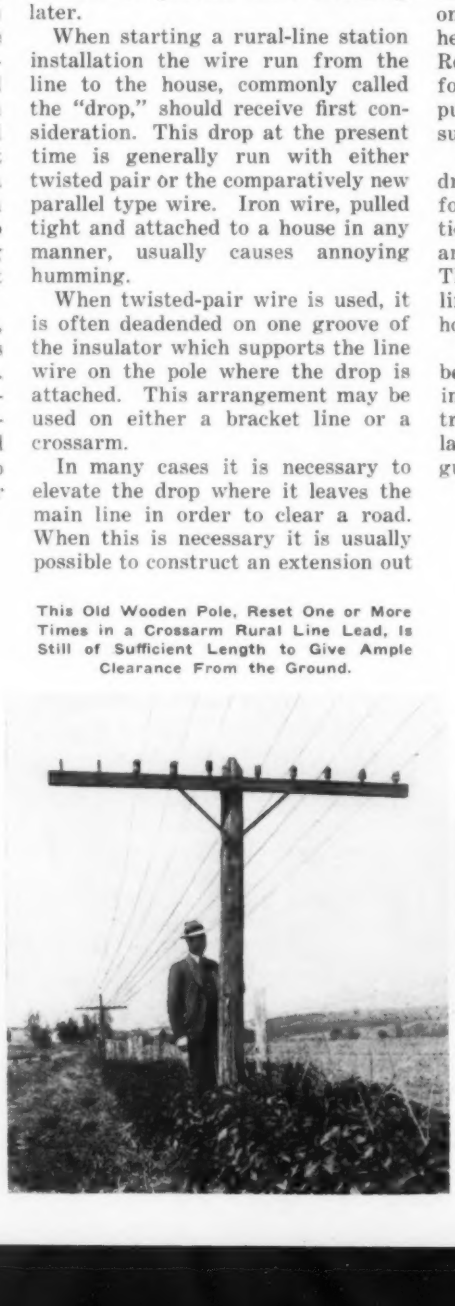
In running drop wire, care should be taken to avoid all trees. If it is impossible to clear a tree, special tree wire should be used or the regular wire protected with a suitable guard.

The solderless connector is con-



New 20-Ft. Cedar Pole With Treated Butt Used to Support One Metallic Circuit on Brackets for Rural Line Use. This Pole Is Set to Proper Depth and Gives Ample Clearance.

This Old Wooden Pole, Reset One or More Times in a Crossarm Rural Line Lead, Is Still of Sufficient Length to Give Ample Clearance From the Ground.



On This Rural Line a Short Crossarm Without Braces Is Used Instead of Wooden Brackets. Some Claim This Method Is Better and More Lasting Than Brackets, Also Giving Better Ground Clearance.

sidered ideal for connecting the drop wire to the line.

The soldering of a small wire to the usual iron line wire is a most difficult task, not always successfully performed. The heat necessary for good soldering also often weakens the line wire. The solderless connector properly installed makes a good and lasting job.

Some make the mistake of having the drop wire too long and pulling it too tight, thus placing excessive strain on the attachments. In no case should a drop be over 200 feet long and a shorter one, of about 100 feet, is considered much better.

The setting of one or two short poles on the drop between the main line and the house is considered a much better practice than attempting to maintain extra long drops. This is especially true in heavy sleet sections of the country. About 2½ feet of slack should be left in a drop of 100 feet in length. Drops should preferably pass under rather than over obstructions so that they will clear properly when they stretch, after being in service for some time.

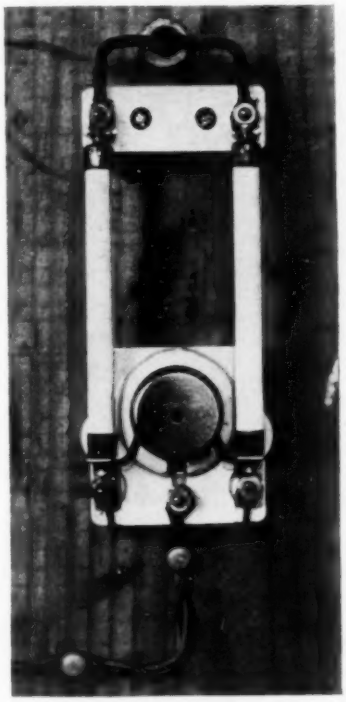
The first attachment on the building should be placed so that strain will have the correct angle of pull. Regular porcelain tubes may be used and attached to wood or stucco walls with screws. Iron brackets or angle screw fixtures may also be used to support the knob.

Brackets may be attached to masonry with drive type or expansion anchors. Masonry drive hooks may be obtained to support the drop wire clamps. The ring on the drop wire clamp may also be placed in the groove of a regular knob and used to support it. Insulated screw eyes may be obtained for intermediate supports on the horizontal and vertical runs on the building. These are especially desirable for use on frame and stucco buildings.

The horizontal spacing of attachments on buildings should ordinarily be from seven to nine feet apart, and the vertical ones not over 10 feet apart. In extremely windy sections of the country the vertical spacing should not be over five feet, for the wind often causes the wire to revolve in a circle between attachments and sometimes twists it off. The drop may be deadended with a porcelain cleat arrangement at the house entrance.

The drop wire entrance into the building should normally be made through a porcelain tube. The head of the tube should be on the outside. The tube should slope upward so that it will drain and not permit water to pass into the building. Either a ⅜ths or ½-inch porcelain tube is generally used for a single drop entrance. Larger size tubes may be used when a greater number of drop wires enter one building.

The tube may be wedged into the hole with a wrapping of friction tape around it, near the head. The hole bored through the wall for the tube should provide a snug fit. The end of the tube should not extend more than ¼th inch beyond the wall surface inside the building. A regular tube-



Typical Protector Installation of the Two-Piece Type, Asbestos Mounting Being Omitted in This Instance. Proper Drop Wire and Ground Wire Entrances Are Indicated.

cutting tool may be purchased at a reasonable cost. The outer end of the tube should be sealed by wrapping the drop wire with several layers of friction tape, which is then pulled firmly into the tube.

In some cases, flexible loom is used in place of porcelain tubes to protect the wire through the building wall. This arrangement will ordinarily prove satisfactory but is not considered as safe as the tube under all conditions.

The drop entrance should always be made where it will be as unsightly as possible. In a masonry building it can generally be placed in a window or door sill. Stone or brick walls should never be drilled for a drop entrance except as a last resort. When a building has a dry basement, the drop entrance into it is always preferred.

Entrance at the front of a residence is always to be avoided if it is at all possible to reach the rear or side of the house. Frequently, it may be necessary to make the first attachment on the front of the house and then make a horizontal run to a suitable location in the rear.

Numerous types of good substation protectors may be purchased at a most reasonable cost. In view of the protection they provide, their proper use should never be neglected, for they are cheap insurance against damage of expensive equipment and property.

One popular type of indoor protector is a fuse and carbon block air-gap unit, designed for substation protection against lightning and crosses with high voltage electrical circuits. The base consists of two pieces of porcelain, the line end only being equipped with fuse clips. The other end has fuse clips, ground connection and a well for the discharge blocks. This type of protector should be mounted on a suitable asbestos mat which comes with it. If desired, the base only of this arrester without fuses may be used.

A new "rosette" type protector, now available, does not require the space for mounting as does the type just described. It is a small, round all-porcelain unit which (when closed) presents an especially neat appearance, with no projections or exposed terminals. This protector may be equipped with either five or seven-ampere glass fuses. Maintenance men can tell at a glance, without testing, whether this type fuse is open. These fuses are mounted on each side of a well containing the discharge blocks.

The enclosed, weatherproof-type protector is increasing in popularity for substation protection. This protector has the advantage that it can be mounted outside and trouble in grounded discharge blocks may be cleared even when subscribers are not at home. This type protector is equipped with a corrosive and rust-proof hood and a galvanized iron mounting bracket.

The base is a single piece of white glazed porcelain formed to provide easy access to all terminals. The line wires are drawn through holes in the base and terminated at the bottom fuse clips. The instrument and ground wires are likewise brought in through the base, up the back of the face plate and through holes to terminals beneath the top fuse clips. This arrangement provides wide sep-

aration between terminals and results in increased protection.

It is generally considered necessary to use drop wire from the outdoor mounted protector to the building. This necessitates connecting the drop wire to the house wire, which

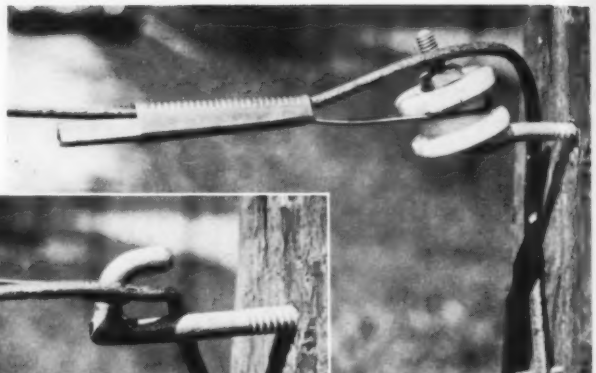
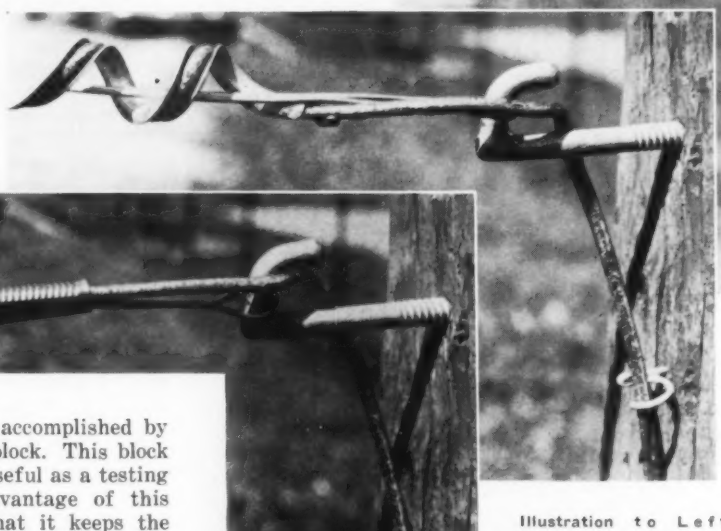


Illustration to Right Shows Drop Wire Clamp Supported by an Angle Knob Screwed Into the Pole.



New Type of Spiral Drop Wire Clamp Supported by a Drive Hook.

Illustration to Left Shows Drop Wire Clamp Using Parallel Type Drop Wire and Supported by a Drive Hook. Note Small Drive Ring on Pole Holding Drop Wire in Position.

can usually be best accomplished by a small connecting block. This block may also be found useful as a testing point. Another advantage of this type protector is that it keeps the lightning charge outside the building where less damage is likely.

When protectors are installed inside of buildings on plaster or any type of wall which may at times become damp, such as masonry, a backboard should be used. Protectors should always be mounted vertically; mounted horizontally, dust may bridge the gaps in the open space cut-outs. Sometimes in basements protectors may be satisfactorily mounted on the ceiling. A joist is also an ideal basement location for the mounting of a protector.

The protector may be mounted with the drop wire terminals either at the top or bottom, whichever is most convenient. When the old style carbon blocks with mica dialectrics are used, the slot in the mica should always be placed down to prevent dust accumulation.

The best protector made will be worthless without a good ground connection. While a water pipe connection is absolutely satisfactory, they are not commonly available for rural line use. A good ground rod about ½-in. by 5-ft., properly installed, generally gives perfect service.

A good practice is to dig a small trench about six inches deep, at right angles to the wall, for a distance of about two feet. The ground rod is then driven into its full length at the end of this small trench. The ground wire should be connected firmly to the rod, either with a suitable clamp or a good soldered connection. The ground wire should be protected at the ground level and about a foot above with either flexible loom or moulding, after which the trench should be well filled with tamped earth.

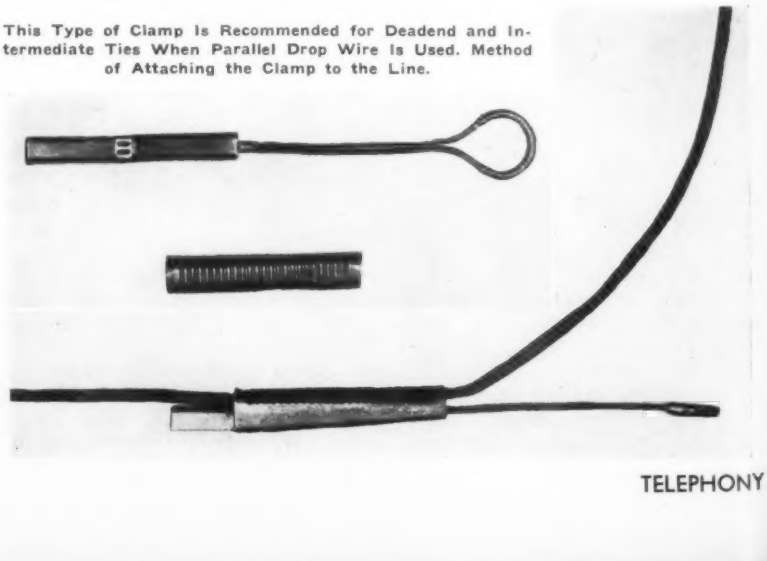
Such a ground connection as described should remain serviceable for more years than any of us will have occasion to worry about.

Ordinarily, No. 14 rubber-covered copper wire is used to extend the ground connection from the rod to the protector. This wire should be run in the open and never concealed or covered with conduit. The ground wire should be run as direct as possible from the protector to the ground connection and should be of one piece, without splices. It should be attached to walls with either cleats or staples.

When the protector is mounted inside the building, the drop and ground wire should in all cases enter the building through separate holes. The ground wire need not be protected with flexible loom or porcelain tubes but may be wrapped with a reverse layer of friction tape where it extends through the wall.

When the protector is placed inside, it should be installed as near the drop and ground entrance as possible. The line should extend from the protector to the telephone with twisted pair inside wire. If desired, the house wire may be easily con-

This Type of Clamp Is Recommended for Deadend and Intermediate Ties When Parallel Drop Wire Is Used. Method of Attaching the Clamp to the Line.



cealed in modern frame houses. The concealing of inside wire is generally made especially easy when the protector is installed in the basement of the building.

Special inside wire or upholstering tacks should be used to fasten the wire when it is run along moulding and baseboards. Tacking wire on plaster should always be avoided. The conventional colored house wire, when properly installed, blends well with the average room decorations.

Numerous improvements have recently been made by all manufacturers in the magneto telephone sets ordinarily used for rural homes. The handset has finally found its place on the magneto telephone. Some have adapted the handset to the conventional wooden wall or desk bell box and it replaces the customary receiver and transmitter. Some others have developed a streamlined effect in the new wall box. A handset of regular design, of course, also may replace the conventional desk stand for magneto operation.

Some may claim that the care and detail specified here would be worthless for rural line installation work. It is believed, however, that this careful detail will in all cases save money by reducing the later cost of maintenance. Telephone companies are beginning to learn that they must do things the best way—even though it costs money—if they expect to make money.

Proper use of good tools and material is believed worthy of consideration by any telephone company that wishes to progress and prosper.

▼ ▼

Installer Finds Missing Child After Connecting Telephone

Not long ago a two-year-old child strayed from his home in Washington, D. C. Having no telephone in her home, Mrs. Baker, the mother, used a neighbor's telephone to spread the alarm. As evening came on and the boy had been missing for seven hours, the distraught parent called the Chesapeake & Potomac Telephone Co. and asked if a telephone could be installed immediately.

It was installed promptly by William Hoofnagle. While at work connecting up the instrument, he was shown a photograph of her missing boy by the mother. After he had completed the installation and had driven only ten or 12 blocks the installer found the child in the company of two older boys who were trying to find out where he lived in order to take him home. In 15 minutes the installer had returned him to his relieved and grateful parents.

41st
ANNUAL CONVENTION
OF
INDEPENDENT TELEPHONY

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October 12-13-14-15, 1937

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To renew your acquaintance with old friends.

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To hear what is going on in the industry in a National way.

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All Telephone People are Invited.

UNITED STATES INDEPENDENT TELEPHONE ASSOCIATION

CHICAGO, ILL.

Nine Simultaneous Conversations By Short-Wave Radio

BRITISH POST OFFICE inaugurates a nine-channel ultra short-wave radio link between Ireland and Scotland with unattended stations operated by remote control from nearest telephone exchange. Principles of operation of the system and arrangement of the transmitting and receiving equipment

AN ULTRA short-wave radiotelephone circuit which transmits nine completely segregated two-way telephone conversations simultaneously—the first radiotelephone installation of this capacity in the world — has been established by the British Post Office between Ireland and Scotland. The inauguration August 31 by Walter J. Womersley, M.P., assistant postmaster general, of this Belfast-Stranraer radiotelephone link, marks one of the most outstanding achievements of today in the world of communications.

The new nine-channel ultra short-wave system is applied on one of the busiest telephone pathways in Europe connecting the telephone system of Northern Ireland with that of England and Scotland and, through London, with the rest of the world. The radio link covers 41 miles over the North Channel of the Irish Sea between Belfast, Ireland, and Stranraer, Scotland.

The nine conversations are carried simultaneously on the one radio carrier and are separated at the receiving end so that each connection is thoroughly as private as though confined to a pair of wires. It is also as secret, for the nine-channel system is equipped with a scrambling device similar to that in use on the transatlantic circuits.

Although the use of ultra short waves for commercial telephony is by no means new—an experimental service having been operated by the British Post Office as long ago as 1932—this is the first application in Great Britain, or in fact in the world, of a system wherein as many as nine telephone channels are passed simultaneously over a single radio link.

The nine-channel ultra short-wave system is the culmination of six years of intensive research and development work by laboratories of subsidiaries of the International Telephone & Telegraph Corp. in France and England, which have pioneered the application to radio communication of micro-rays (tiny radio waves of about 10 centimetres) and ultra short waves (wave lengths of less than 10 metres). Standard Telephones & Cables, Ltd., an associated company of the I. T. & T. which developed the system in collaboration with the engineers of the British Post Office, engineered, manufactured and installed the system.

In 1931 the laboratories demonstrated for the first time the use of micro-rays on a circuit across the English Channel between Dover, England and Calais, France. The British Post Office became interested in the micro-ray and ultra short-wave field in 1932, and in 1934 the Lympne-St. Inglevert micro-ray link across the English Channel to France was established by the Air Ministry to report the flight and arrival of airplanes. It operates on a wavelength of 17.4 cms. over an optical distance of 21.7 miles (35 km) (TELEPHONY of September 15, 1934.)

An ultra short-wave radio telephone installation, single-channel development forerunner of the nine-channel system, was installed in 1935 between the Spanish telephone network and the Island of Majorca.

Foremost among the virtues of the ultra short waves is the possibility of transmitting wide band widths. The width of the band that can be transmitted increases as the wavelength is shortened, and it is for this reason mainly that high definition television stations all operate in this region, as they require a total band width of as much as six megacycles.

The new nine-channel ultra short-wave equipment is designed for unattended operation and is capable of complete remote control from the nearest telephone exchange. In addition, it is provided with spare equipment, part of which is brought automatically into operation on the occurrence of any abnormal condition.

Both transmitting and receiving equipments derive their whole power supply from the public supply mains, the only battery used in the equipment being that for the operation of the relay system. A Diesel electric power plant is arranged so that in the event of failure of the public electric supply, it will take over the load automatically approximately one minute after such failure and thus

COMING CONVENTIONS

Telephone Association of Maine, Poland Springs, September 20, and Lakewood, September 21.

The Illinois Telephone Association, Hotel Pere Marquette, Peoria, September 22 and 23.

South Dakota Telephone Association, Hotel Cataract, Sioux Falls, September 28 and 29.

Telegraph and Telephone Section, Association of American Railroads, The Medinah Club, Chicago, October 5, 6 and 7.

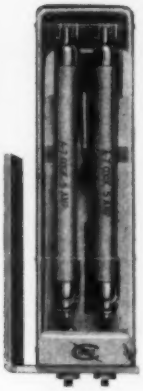
Independent Pioneer Telephone Association of the United States, Hotel Stevens, Chicago, October 14.

United States Independent Telephone Association, Hotel Stevens, Chicago, October 12, 13, 14 and 15.

Canadian Independent Telephone Association, King Edward Hotel, Toronto, Ontario, October 20 and 21.

Cook True Gap Dischargers
Do Not Permanently Ground The Line

No. 7 Lightning Arrester

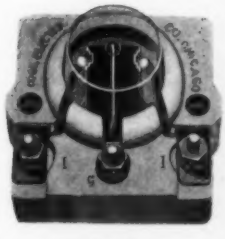


Type "O"
Substation
Protector

Pole Cable
Terminal
6 to 101 pairs

Do thunder storms interrupt your service and cost you time and money in clearing carbon troubles? Cook True Gap Dischargers will eliminate this trouble. They give adequate protection without permanently grounding the line. All the Cook protected products shown are equipped with True Gap Dischargers.

Write for a sample of this efficient time-and-money-saving True Gap Discharger.



No. 2
Lightning Arrester

COOK ELECTRIC CO.

2700 SOUTHPORT AVE. CHICAGO

COOK TRUE GAP DISCHARGERS DO NOT PERMANENTLY GROUND THE LINE

avoid serious interruption of the service.

Principle of Operation of Transmitter

Let it be assumed that the input of channel No. 1 is supplied with sinusoidal tone of frequency fl kc. per second. This input modulates a channel-frequency oscillator having a frequency in the range 150 to 300 kc. per second, say, 155 kc. per second, resulting in a carrier frequency of 155 kc. per second together with upper and lower side bands of (155 +fl) and (155—fl) kc. per second.

If channel No. 2 be supplied with a tone input of frequency f2, this will modulate an oscillator having a frequency of, say, 165 kc. per second, resulting in a carrier frequency of 165 kc. per second and upper and lower side bands of (165+f2) and (165—f2) kc. per second. Similarly, channel No. 3 may have a carrier frequency of 180 kc. per second, and so on to the ninth channel, of which the carrier frequency might be 280 kc. per second.

The bands of frequency derived from the nine channels are now added together, producing in total a single frequency band extending from (155 —fl) kc. to (280+f9) kc. per second.

This total frequency band is now used to modulate the output of the ultra short-wave transmitter having a carrier frequency in the neighborhood of 76,000 kc. and to produce by this means a lower side band extending from 76,000—(280+f9) kc. to 76,000—(155—fl) kc., the carrier wave of 76,000 kc., and an upper side band extending from 76,000+(155— fl) kc. to 76,000+(280+f9) kc. per second. This is the band of frequencies which is radiated by the aerial system.

The band of frequencies radiated by the transmitting system, as just described, is delivered by the distant receiving aerial system to a superheterodyne type of receiver. The second detector of this receiver produces from the foregoing input the original side band extending from (155—fl) kc. to (280+f9) kc.

This band of frequencies is then applied to a bank of nine selecting circuits which operate as band-pass filters. The currents of frequency (155—fl), 155 and (155+fl) kc., will be passed by the first filter to a detector circuit which delivers the original frequency of fl kc. to the first channel. Similarly, the frequencies (165—f2), 165 and (165+f2 kc. will be passed by the second filter to a detecting circuit which delivers the original frequency f2 to the second channel.

In this manner the whole of the band of frequencies delivered by the second detector of the superheterodyne receiver will be split up, detected and delivered to the appropriate channel.

The carrier frequency of the ultra short-wave transmitter is held constant within very close limits by a crystal-controlled master oscillator, while the beating oscillator of the superheterodyne receiver is similarly crystal controlled. By this means a high degree of selectivity may be attained in the receiver without any necessity of frequent returning.

The foregoing explanation covers the transmission of nine channels in one direction on a carrier wave of 76 megacycles approximately. For the reverse direction the circuits of the same nine channels are transmitted on a carrier wave of 83 megacycles approximately.

Equipment in the Receiving Station

The receiver is a superheterodyne in the output of the second detector of which the nine auxiliary carrier frequencies of the distant transmitter are present. Each auxiliary carrier, together with its side bands, is separated out by means of filters, amplified and rectified to reproduce the original speech frequencies corresponding to the channel in question. After amplification these frequencies are passed out to the line at the required level.

It is easy to mix together nine channels, but to separate them out again without noticeable crosstalk is a problem on its own. It is on the special design of the channel-selecting circuits, by means of which this end is achieved, that the successful operation of the whole system primarily depends.

Transmitting and Receiving Aerials

In order to minimize interference between the transmitting and receiving waves, the plane of polarization of the waves emitted by the transmitting aerial is at right angles to that of the waves received by the receiving aerial.

At one terminal, therefore, the transmitter is equipped with an aerial system designed for vertical polarization, whereas the receiver is fitted with an aerial designed for horizontal polarization. At the other terminal the receiving aerial is vertically and the transmitting aerial horizontally polarized.

It is quite evident that a fault in any part of the equipment common to all channels would be a catastrophe; a fault in one channel is serious, but the failure for any appreciable time of nine channels is disastrous. The ultra short-wave transmitter unit, being common to all nine channels, is, therefore, provided in duplicate.

The reserve unit is normally not under tension; but if a fault, such as the failure of a valve, occurs the power supplies and the aerial are automatically switched from the service to the reserve unit and a fault signal is given to the distant remote control point.

That portion of the receiving equipment which is common to all nine channels is similarly duplicated. In addition, the power supply, as previously stated, is duplicated by an emergency plant which is switched in on failure of the public supply.

It is believed by radio engineers close to this development that much of the future of radiotelephony over both short and long distances lies in the ultra short-wave lengths, because of the very large number of channels available in this band and because of the high degree of directivity which the ultra short waves permit.

British Post Office officials have been particularly impressed with the economic advantages of a radio circuit of a higher capacity than most telephone cables whose cost is so much greater. The stations at both Belfast and Stranraer, as previously stated, are unattended and are operated entirely by remote control from the nearest telephone switching point. Continuity of service is safeguarded at all times by the provision for immediately automatic switching to spare equipment in case of trouble.

▼ ▼

Grain Belt Planting Bee Sales Contest Is "Tops"

The Central Electric & Telephone Co., of Sioux City, Iowa, recently finished its "Grain Belt Planting Bee" telephone sales contest, with a net gain of 498 stations, only two less than its quota of 500. The results of this sales activity were considered most satisfactory, particularly in view of the fact that it included the season of normal summer disconnects.

Between May 17 and June 30, managers, linemen and operators of 155 exchanges (400 strong) signed up 1,093 new subscribers. During that period 595 stations were disconnected, 75 per cent of them being seasonal terminals.

Manager W. C. Martin, of Slayton, piloted his Farmington (Minn.) district into the lead after the first week and held it for the duration of the campaign.

Highest
in
PRICE

(Patented)

Lowest
in
COST

KELLEMS PRODUCTS, INC., 1911 PARK AVE., NEW YORK, N. Y.

IN THE NATION'S CAPITAL

By FRANCIS X. WELCH

Special Washington, D. C., Correspondent for TELEPHONY

NEW CHAIRMAN OF FCC is obtaining information concerning commission's operations, preparatory to commencing difficult task ahead. Public ownership agitators may be aided in accomplishing nationalization of utility plans under guise of national defense, should war develop. Comments on reports made at annual convention of National Association of Railroad and Utilities Commissioners. REA methods scored

IT WILL take Chairman McNinch the better part of September to clean up thoroughly the loose ends of his duties over at the FPC, although he plans to go on active duty at the FCC about the middle of this month. The new chairman threw quite a scare into the already nervous staff when several strange men began invading all the divisions, asking questions about this and that and purporting to act under authority of the new chairman.

Word flew around that the new chairman, who is supposed to be commissioned by President Roosevelt to do a thorough house-cleaning job at the FCC, had dispatched a corps of lawyers to dig and spy, and nobody's job was safe. Even colored messenger boys, who spend their idle moments at little tables in the commission corridors dreaming of hitting the "numbers," were nervous about the suspicious strangers.

Chairman McNinch relieved the tension, however, when he let it be known that he was only trying to learn the ropes of an exceedingly difficult job in which he has been placed almost overnight. How else was he ever to learn what the FCC is supposed to do, how it is organized, and where this and that is kept and who keeps it?

TRUTH to tell, the new chairman has a terrific task ahead of him. He is just cleaning up one of the most exacting and confining assignments in civilian government duty and now he is thrust into a completely new environment, with new duties, new associates, and—hardest of all—explicit instructions from the boss to clean it all up. In other words before he can find out what is wrong, he has to find out what it is all about.

Such being the case, it is safe to predict that Chairman McNinch will spend at least a month orienting himself before he starts any "purge" in the FCC.

Among other problems the new chairman will inherit is the filling of three vacancies on the FCC staff. These will be filled by the whole commission, en banc, of course, but the new chairman will have a lot to say about it if he wants to. First, there is the vacancy in the chief engineer's office left by the appointment of Commander T. A. M. Craven to the commission's membership. Then there are two assistant general counsel's vacancies in the telephone and telegraph division left by the resignation of Carl F. Arnold and the sudden death of Elmer D. Hays, respectively.

BECAUSE the last week has been more or less quiet on routine affairs, your correspondent decided to look into the tax situation with special reference to utilities and telephones in particular. Most readers are probably familiar with the general outlines of the government fiscal problem—a national debt of 37 billion and an annual budget out of balance by about 38 per cent.

Most readers are also probably aware, in a general way at least, that utility taxes have increased over 45 per cent during the last eight years and are now somewhere in the vicinity of 14 to 15 per cent of gross revenues. But what does not seem to be popularly realized is the regular and insidious trend towards so-called indirect taxation.

Unbalanced as our Federal budget is, direct taxes amount to less than 15 per cent of required income to operate our government. More than twice as much (about 32 per cent) is derived from indirect taxes, and the balance of required revenue comes from current borrowings, with a small amount of customs and other odds and ends of revenue thrown in.

This means that only 15 per cent of our Federal revenue comes from open, clear-cut levies, such as income tax, estate tax, etc., for which the taxpayer realizes his personal tax responsibility. Furthermore even this sense of tax responsibility is not very widespread, as far as Federal taxes are concerned, because only a small fraction of our total population pays any formal taxes to the Federal government. The important point for utilities to keep in mind is the current tendency to reduce this direct taxpaying margin so that the proportion of actual taxpayers becomes less and less.

This trend is visible in a number of ways. There are the homestead exemption laws adopted in Florida and widely considered in other states where household real estate is exempted from taxation up to a certain amount. There is the urban trend away from house owning and in the direction of apartment house renting.

All this necessarily means that our legislatures, both state and Federal, will be more and more keen to utilize additional methods of painless tax extraction. And in this respect the utilities, including the telephone, afford a more tempting target.

Probably nothing will be done about it. Maybe nothing can be done about it. Maybe the utilities will be more secure in the ownership and management of their properties as official tax collectors for the Federal and state governments even if service and rates do suffer as a result. But if any attempt is ever to be seriously made to stop this steady slipping towards the path of least financial resistance from an irresponsible citizenry, the first move will have to be made in the form of waking up the citizen—the poor citizen—to the sad

(Continued on page 38)

ICE EQUIPMENT to Meet Every Need

FOR MANUAL SERVICE

Monotype Manual Switchboards offer the user of manual equipment the highest economy—both in first cost and in upkeep.

Steel frame construction—one of the many outstanding features of Monotype design—insures exceptionally long life with perfect alignment and accurate operation of all parts. This extra-rigid, extra-strength construction also means a minimum of maintenance—even under conditions of the most severe usage.

Besides this built-in durability, Monotype boards are provided with the latest circuits, relays of highest quality and proved reliability, and Monotype cords—noted for their exceptional wearing ability. Couple with this the beauty of the finest cabinet work, and you wonder how Monotype boards can be sold so reasonably! Certainly you pay no more for Monotype proved quality, than for products of ordinary or inferior performance—so why not investigate the Monotype line—at once? Write for further information.

E L E C T R I C

AND SIGNALING PRODUCTS

Export Distributors: AUTOMATIC ELECTRIC SALES COMPANY, LTD., Chicago

(*Continued from page* 34)
fact that he is really paying taxes.

True, trying to make the public tax-conscious is a hard and thankless task. Politicians are dead set against it for obvious reasons. So far, chambers of commerce and other groups have not made much of a success of it. That is why the average citizen is something like the careless student who said an indirect tax was like a dog tag tax, "because the dog doesn't have to pay for it."

TELEPHONE executives would be well advised not to overlook one angle of these international fireworks which are going on in Europe, Asia, and Africa; and that is the possibility that government ownership agitation may be given a boost under the disguise of preparedness for national defense.

The public ownership bloc in the House of Representatives (and it numbers about 35 members) realizes that the old arguments about high rates and monopoly are just about exhausted against the private power industry and never did mean anything as far as the communications industries were concerned. But, remember, this public ownership bloc is dedicated to government ownership and operations of all utility services, including transportation and communications industries. Some members would even include banking and certain basic industries, such as steel, coal, and lumbering, which affect our natural resources, but that is too extremely Leftish to be worth bothering about.

The point is that the public ownership leaders are quietly exchanging letters and preparing a "public-control-of-public-service-for-public - protection" program, all ready to bring right out into the open in the event of any serious threat to peace in this country.

THE FUNDAMENTAL idea of this group is that the very same kind of nationalistic pressure which resulted in public operation of the railroads during the World War under the Plumb Plan, and the extension of Post Office control over communications under the then Postmaster Burleson could, under smart maneuvering by a government ownership bloc in Congress, be used to nationalize public service in such a way that government control would not be abandoned after the emergency had passed.

In other words, many simple citizens who are flatly opposed to government ownership as a regular commercial proposition, and who would think the very suggestion of it for our efficient national telephone system ridiculous on its face, might think otherwise if the socialization were smuggled into Washington inside of the Trojan Horse of patriotic duty, national defense, preparedness, and all that sort of thing.

At present, the whole thing is nothing to be alarmed about—nothing more than an exchange of summer correspondence between a congressional group that never was in a majority and is not likely to be, from the present outlook. However, it is not at all a waste of time for private industry to think up counter offensive measures. Of course, we don't expect war or even a threat of war, but it is just as well to be prepared or at least have a plan of procedure in a blueprint stage—just in case.

What can be done about it? Well, certain executives in other industries have recently indicated their interest in the possibilities of voluntary mobilization of private industry during periods of national emergency. There was, for instance, the old War Industries Board organized largely by Bernard M. Baruch which coordinated very well with Army and Navy authorities during the World War. That was a pattern worthy of some study.

War isn't a pleasant subject to plan for, exactly, but with the public ownership members turning it over in their minds, it might not be a bad idea for other folks to give some thought to the matter.

BECAUSE the annual convention of the National Association of Railroad and Utilities Commissioners took place last week away out in Salt Lake City, comment upon it is a little outside of this department's bailiwick. However, your correspondent cannot resist a temptation to say "told you so" about the animated discussion which took place at the morning session of the third day of the convention (September 3). That was the session devoted to rural electrification; and if you ever thought the

POINTS OF VIEW

By MISS ANNE BARNES

Traveling Chief Operator, Iowa Independent Telephone Association, Des Moines, Iowa

AN INMATE of an insane asylum told a group of visitors passing through that he would not be there if everybody thought as he did. Then he went on, "I think everybody is crazy except myself but no one else thinks as I do. Therefore, I am here, but I still believe in my point of view."

"Poor fellow," the visitors thought. But, of course, no one tried to make him see differently. Such an attempt would have been futile.

However, it is not unusual to meet perfectly sane people who are so narrow-minded that they will not consider a point of view different from their own. What can such folks hope to learn if they will not even consider another's point of view?

The real test of an open-minded person is his willingness to put himself in another's place in order to consider without heat a point of view different from his own. By doing so, he often finds himself facing new facts which will amplify and improve upon his own point of view.

The real purpose of telephone conferences is meeting for the purpose of an exchange of ideas; for you to give me some of your suggestions, for me to give you some of mine; for you to give some of your experiences, for me to give you some of mine; for you to give me some of your life, for me to give you some of mine.

Says A. H. R. Fairchild, educator, Columbia, Mo., in part, "The most distinctive mark of a cultured mind is the ability to take another's point of view. . . . To see life and its problems from a point of view different from his own. . . . To be willing to test a new idea. . . . To be able to live on the edge of difference in all matters intellectually. To have imaginative sympathy, openness and flexibility of mind, steadiness and poise of feeling, cool calmness of judgment, is to have culture."

MORAL: Cultivate *points* of view.

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commissions are pleased as Punch with the way Federal REA is putting over its program, you should not miss a study of the remarks made at that session.

The views accredited to Leo H. Leary of the Massachusetts Department of Public Utilities should be especially enlightening.

Speaking of utility taxation, it does appear from a report made by the NARUC's "Committee on Progress in Public Utility Regulation" that the state commissioners are getting together on a system of making the utilities ante up for the expense of their regulation by the state commissions.

Of the many committee reports presented to the national convention, this committee report (together with the report of the "Committee on Public Utility Rates") impressed this correspondent as betraying the most painstaking research and soundness in thought and argument.

The report was presented by the committee chairman, Dr. Paul J. Raver, executive director of the Illinois Commerce Commission, and signed by Commissioners Benjamin of Washington, Bissell of Connecticut, Buchanan of Pennsylvania, De Brier of New Jersey, Frye of Louisiana, Jourolman of Tennessee, and Hunt of Wisconsin.

The report is frankly a begging document for more state commission appropriations, which is to be reasonably expected from such a body. However, it is interesting to know that excluding the four large states of New York, Pennsylvania, California, and Illinois, the average annual appropriation for 31 state commissions reporting to the committee was over $141,300 a year.

Throwing in the big four, the average rose to $229,300, which is only 20.7 cents for each hundred dollars of revenue collected from the utility companies regulated.

The committee report goes on to review a number of court decisions in which state taxation of utilities for the expense of the regulation has been upheld, including one opinion of the U. S. Supreme Court—Great Northern Railway Co. v. State of Washington, 300 U. S. 154 17, P.U.R. (N.S.) 475—in which the principle of such levies was upheld (although the enforcement of a Washington statute in that case was restrained because of improper application of the principle to different utility groups). The conclusion is inescapable that such a tax, where the statute is properly drawn, is perfectly valid.

The committee's report analyzes the different methods of application of utility tax assessments to support state regulation as found in the various state laws, and recommends a uniform law, a draft of which was authorized by the committee to be recommended by the state commissions to the state legislators. So now you know what to expect when your state commissioners march on your state capitol looking for more household allowance.

Summing up the variety of utility assessments to support state regulation, the committee report found that out of 35 state commissions reporting, some received 100 per cent of their expenses from assessments on utilities, five received from 75 per cent up, five from 50 to 75 per cent, eight from 25 to 50 per cent, and two from 1 to 25 per cent, while eight had as yet left that vein of revenue entirely untapped.

When FCC Telephone Chairman Paul A. Walker left Washington for the Salt Lake City convention, this writer understood that Mr. Walker would merely represent his commission and make only informal remarks, if any. Apparently, he changed his mind somewhat. Maybe the fact that Carl Wheat, FCC Special Telephone Counsel, was too busy here in Washington to go out to take his part in the commissions' program moved Commissioner Walker to stand up and at least let the state commissioners know that the FCC was on hand and interested. The ICC, FPC, and REA were well represented.

SPEAKING of things out West, word comes that the California commission is putting the finishing touches on its "supplementary study" of the valuation of Pacific Gas & Electric property, preparatory to arguing its motion for rehearing before the U. S. Supreme Court next month. Remember that the commission lost its gas rate reduction appeal last June by a tie vote, 4 to 4, with Justice Sutherland not participating.

Well, the court will sit in October with the new addition of Mr. Justice Black, and maybe the commission will get its motion for rehearing granted. If so, watch out for a landmark rate valuation decision next fall or winter, because the California commission's valuation was based almost entirely on original cost.

The Operators' Corner

By MRS. MAYME WORKMAN

Traffic Supervisor, The Illinois Telephone Association, Springfield, Ill.

HELPFUL TRAITS for chief operators in fulfilling their traffic responsibilities. Series No. 301

IN LAST week's "Operators' Corner" we analyzed several of 21 excellent traits which tend to develop successful leadership as outlined by Donald A. Laird in his book, "How to Use Psychology in Business." We shall continue to analyze some of these admirable traits.

"Criticize the work of others but do not antagonize them." This is an excellent admonition. Everyone in a supervisory capacity must at some time or other criticize the work of others. If the criticism is made in the proper manner it will result in a sincere effort on the part of the person criticized to correct the error called to their attention.

On the contrary, if the criticism is made in a fault finding or nagging way, it will leave a resentful feeling and no good will result from it. It is always well to consider the other person's position and to make the correction in the manner in which *you* would appreciate being corrected.

"Assume the responsibility for your own mistakes, without passing the buck." In other words, if you are wrong, be big enough to frankly admit it without making excuses for the error.

"Make people feel at ease when you are talking with them." This is indeed a valuable trait in conversing with subordinates. If a chief operator senses that an operator is fearful or ill at ease when she has occasion to converse with her, she should immediately attempt to make the operator feel comfortable and eradicate any feeling of fear.

"Get the habit of concentrating under difficult conditions of light, heat and noise." This seems to be difficult for the average person. They can go along very well under normal conditions but if anything unusual

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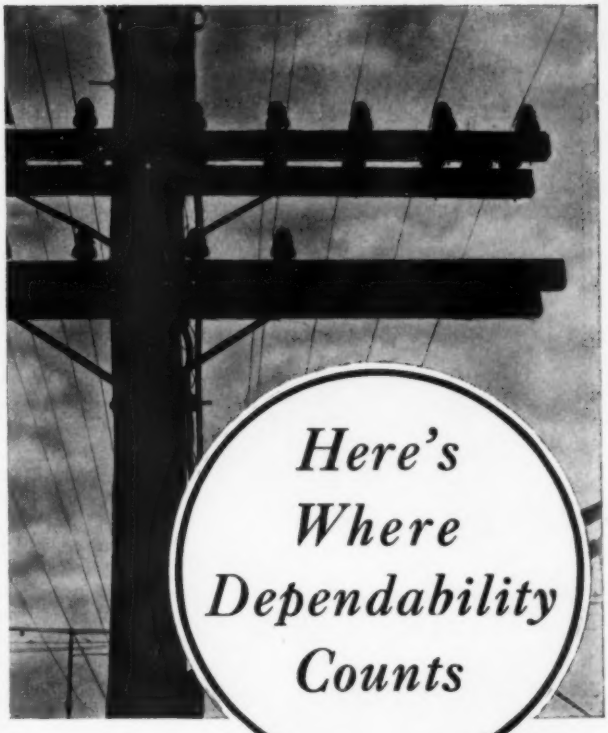

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The long life of these wires is further increased by our hot galvanizing process, a tried and tested method wherein the properly treated wire is passed through a molten bath of pure, high grade zinc. Both metals are chemically bonded, to form as strong a combination as when hydrogen is combined with oxygen to form water.

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happens or their usual atmosphere is changed it seriously hampers their efficiency. The habit of concentration can be developed by practice.

"Examine your own decisions critically for a few minutes, before accepting them as final." This is excellent advice. We should not defer making decisions but on the other hand they should not be made rashly or indiscriminately. If a decision is made in this manner it will frequently result in an error of judgment. We should not defer making a decision because the matter to be decided is an unpleasant one. If a decision must be made, procrastinating will not eliminate the unpleasantness of the task.

"Size up others closely so that you are able to know what they can do and what they cannot do." A chief operator should be familiar with the ability and limitation of each employe on her force. She should be able to advise the manager as to the qualifications of each individual, for example, operators who can qualify for supervisory, toll and information work. The chief operator may acquire this knowledge by observation and personal contact.

"Keep free of prejudices by dealing fairly and squarely with others, regardless of race, religion or social standing." One of the most frequent criticisms of people in a supervisory capacity is that they are prone to show partiality or favoritism. While this criticism is not always merited, unfortunately some chief operators knowingly or unconsciously do favor some of the operators on their force.

This action places the chief operator in an unfavorable position and causes dissatisfaction among the operating force. Every chief operator should be very careful in this respect. Always be fair and impartial in all dealings with your operators and you will be certain to merit their respect.

"Be able to enjoy a good joke." Recently the writer was working in an exchange under very trying circumstances and in conversing with a gentleman in a managerial position laughed very heartily about a situation which might have been viewed quite tragically. The gentleman stated, "You certainly have a keen sense of humor" to which the writer replied, "If you do not possess or develop a sense of humor in this business, you are sunk." Many a trying situation can be carried off to a successful conclusion if you are able to laugh or smile.

If you do not have a sense of humor and the ability to remain calm and undisturbed under trying conditions, develop that trait. It will help you over many rough spots and make life pleasant and happier.

Questions from Illinois Operators

1. On a collect station-to-station call, the called station refuses to accept the charge and the calling party agrees to pay for the call. Does it remain a station-to-station call or does it take the person-to-person rate?
2. In what way does the present practice regarding "ringing" and "verbal" clearance effect a saving in operator's time?
3. When an operator needs charges on a collect call from her office to another, why doesn't she ask for them before conversation?
4. Does the practice of holding the calling party on the line one minute on an NC condition apply to tributaries as well as toll centers?
5. Do you use rising inflection when you say "Thank you?"

The answers to these traffic questions are given on page 45.

NBC Broadcast of Independent Telephony

The recent interviewing of Executive Vice-President Louis Pitcher of the United States Independent Telephone Association, during the Farm and Home hour of the National Broadcasting Co., concerning the Independent telephone industry, has brought in many favorable comments.

"We want to thank you for calling attention to the Independent telephony broadcast over NBC," writes the Pulaski (Wis.) Merchants & Farmers Telephone Co. to TELEPHONY. "It was what we had been hoping to hear for a long time. Sincerely hope the good work is continued."

During a call at TELEPHONY's offices last week, Otto Wettstein, Jr., president of the Florida Telephone Corp., Leesburg, Fla., told of visiting at his daughter's home in Iowa. Unaware of the broadcast, he turned on the radio one noon and heard the announcer saying: "His name is Louis Pitcher, executive vice-president of the United States Independent Telephone Association."

So, Mr. Pitcher had another attentive listener. "It came through fine, and it was the first time I had heard his voice in 25 years," said Mr. Wettstein. He and Mr. Pitcher engaged in the telephone business in adjoining counties in Illinois about 40 years ago. Incidentally, Mr. Wettstein spent July and August on an interesting sightseeing trip via automobile to the Pacific Coast, going by the southern route and returning by the central route.

INSULATION OF RURAL LINES

(*Concluded from page 20*)

entirely out of service after even a light summer shower.

It finally got so bad that we decided to clear it up for them, so we started early one morning from the central office to cover the entire line. We carefully trimmed all trees, cleared all wire from contact with fences, replaced all broken or missing insulators, cleaned carbons in arresters and eliminated all possible contact with the ground.

When we called in from the first station, we could barely hear the operator. On successive tests from other stations, the transmission gradually improved and when we reached the last station the line was talking clear as a bell with apparently perfect transmission. The line continued to give good service thereafter, in all kinds of weather.

In this case the dry cells at all stations were in good condition, for the troubleman had been changing them frequently instead of making the much-needed line repairs. We spent only a few dollars in time and material to improve the insulation resistance of the line which changed exceptionally poor transmission to nearly perfect. Certainly this was money well spent!

It is our honest opinion that any telephone company will do well in its annual overhaul or check-up, to cover all rural lines, carefully giving special attention to insulation. While tree trimming is ever important, it is not as generally neglected as are insulators. The replacement of defective insulators will not cost much, in view of the improvement which will be noticed in the service in general.

▼ ▼

Call Students to Telephone by Means of Loud Speaker

A loudspeaker system has been installed in Lehman Hall, the girls' dormitory of Capital University, Columbus, Ohio, in order to summon its residents to the only public telephone, located in the Capital bookstore in the basement of the building. Until the recent installation of the public address system Miss Alma Creager, clerk in the bookstore, was obliged to strain her vocal chords to the utmost, especially in summoning residents of the third and fourth floor of the dormitory to the telephone.

The loudspeaker equipment installed is so constructed that a general call can be made to all floors of the building or, by throwing a switch, the call can be directed to one particular floor.

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These pay stations are designed for wall mountings or may be mounted in a corner by means of a corner bracket or on a shelf by means of a shelf bracket. The upper housing, coin box and backplate are of heavy pressed steel and the cash compartment door is of hardened pressed steel to prevent burglary. A buglar alarm switch, which is operated by the cash compartment lock may be arranged to operate a bell or buzzer adjacent to the pay station.

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- ☐ Lightweight Climbers.
- ☐ Specifications on Linemen's Belts and Safety Straps.
- ☐ Klein Kord Fabric Safety Straps.
- ☐ Pocket Tool Guide.

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RECENT PRICES OF TELEPHONE SECURITIES

(These quotations as of September 3, 1937, are supplied by Telephone Securities Corp., 120 S. La Salle St., Chicago, Ill.)

BONDS

	Bid	Asked
American Utilities Service Corp., 6s, 1964	74	76½
Ashland Home Telephone Co., 4½s, 1961	102½	..
Associated Public Utilities Corp., 5s, 1947	65½	68¼
Associated Telephone Co., Ltd., 4s, 1965	103	105¼
Associated Telephone & Telegraph Co., 5½s, 1955	80¼	82
British Columbia Telephone Co., 5s, 1960	105¾	..
California Water & Telephone Co., 5s, 1965	102¼	104
Central Electric & Telephone Co., 5s, 1955	98½	100¼
Central Iowa Telephone Co., 5½s, 1947	98¾	101
Central Telephone Co., of Delaware, 6s, 1938	12¾	16
Citizens Independent Telephone Co., 4¼s, 1961	101¼	103¼
Commonwealth Telephone Co., of Pennsylvania, 5½s, 1945	89	92¾
Commonwealth Telephone Co., of Wisconsin, 4s, 1966	97¼	98¾
Community Telephone Co., income 5s, 1949	22	25
Cumberland Valley Telephone Co., 5s, 1966	98½	100½
Florida Telephone Corp., 6s, 1945	91½	93½
Florida Telephone Corp., 6s, 1954 second mortgage	66	..
Gary & Co., Theodore, 6% income notes, $5 par	2¼	3½
Home Telephone & Telegraph Co., of Fort Wayne, Ind., 6s, 1943	104½	..
Home Telephone & Telegraph Co., of Fort Wayne, Ind., 5½s, 1955	104	..
Indiana Associated Telephone Co., 4½s, 1965	104¾	107
Indiana Central Telephone Co., 5½s, 1938	84¾	88½
Illinois Communities Telephone Co., 6s, 1949	63	67
Illinois Commercial Telephone Co., 5s, 1948	100¼	103
Illinois Commercial Telephone Co., 5s, 1960	98¾	100½
Inland Telephone Co., 6s, 1948	90	92¾
Interstate Telephone Co., of Idaho, 5s, 1961	99½	102¾
Interstate Telephone & Telegraph Co., 5½s, 1953	94	86¼
Investors Telephone Co., 5s, 1961	52¾	55½
Iowa-Illinois Telephone Co., 5½s, 1949	48	52
Jamestown Telephone Corp., 5s, 1954	103¼	104¾
Kansas Telephone Co., 6s, 1939	flat	40 ..
Keystone Telephone Co., of Philadelphia, 6s, 1951	98½	100¾
Keystone Telephone Co., of Philadelphia, 5½s, 1955	98	100¼
La Crosse Telephone Co., 5½s, 1948	101¼	103
Lexington Telephone Co., 6s, 1944	99½	101½
Lorain Telephone Co., 5s, 1958	101½	103
Michigan Associated Telephone Co., 5s, 1961	102¼	104¼
Middle States Telephone Co., of Delaware, 6s, 1947	98½	101½
Middlewestern Telephone Co., 6s, 1943	70¼	72¾
Missouri Telephone Co., 4¼s, 1961	98½	100
Ohio Associated Telephone Co., 4½s, 1966	99¾	102
Ohio Central Telephone Co., 6s, 1947	94	97
Pennsylvania Telephone Corp., 4s, 1965	104¾	107
Pike County (Ill.) Telephone Co. of Illinois, 6s	102	..
Pike County (Ind.) Telephone Co. of Indiana, 6s, 1946	flat	40 ..
Platte Valley Telephone Corp., 6s, 1947	100¼	103
San Angelo Telephone Co., 5s, 1958	102¼	..
Santa Barbara Telephone Co., 3½s, 1966	98¾	100½
Southwestern Associated Telephone Co., 5s, 1961	96¼	99
Southwestern States Telephone Co., 6s, 1948	63	66½
Southwestern States Telephone Co., 6s, 1949	60	63¼
Standard Public Service Co., 6s, 1948	57	60¼
Telephone Bond & Share Co., 5s, 1958	74	76½
Telephone Service Co., of Ohio, 5s, 1953	79	83¼
Tri-County Telephone Co., 4½s, 1956	100½	102¾
United Telephone Co., of Delaware, 6s, 1948	90	93
United Telephone & Telegraph Co., 5½s, 1953	100	102¼
United Telephone & Telegraph Co., 6s, 1953	100¾	103
Wabash Telephone Co., 4½s, 1956	100	102¼
Warren Ohio Telephone Co., 6s, 1942	98¾	101¼
West Coast Telephone Co., 5s, 1953	96	98
Western Light & Telephone Co., 5s, 1954	98	100½

PREFERRED STOCKS

	Bid	Asked
Associated Telephone Co., Ltd., $1.25	22¾	24½
Associated Telephone & Telegraph Co., 7% first	38½	43
Associated Telephone & Telegraph Co., $6 first	38	41½
Associated Telephone & Telegraph Co., $4 cumulative	9	12½
Bell Telephone Co. of Pennsylvania, 6½% $100 par	116¾	119¼
California Water & Telephone Co., 6% $25 par	22	24½
Central Electric & Telephone Co., $50 par	29	32½
Community Telephone Co., $2 cumulative, no par	1½	3
Commonwealth Telephone Co., of Wisconsin, 6%, $100 par	90½	94
Continental Telephone Co., 7% first	92	95
Continental Telephone Co., 6½% first	88	93
Diamond State Telephone Co., 6½% $100 par	111½	115
Empire Telephone Co., 6% cumulative, Class "A" $25 par	15½	18½
Florida Telephone Corp., 6% cumulative, $100 par	38	..
Gary & Co., Theodore, first $1.60 pfd.	1½	2½
General Telephone Allied Corp., 6% convertible	96¾	98¾
General Telephone Corp., $3 convertible	46	49
Home Telephone & Telegraph Co., of Fort Wayne, 7%, $50 par	50½	53
Illinois Commercial Telephone Co., $6	83	87
Interstate Telephone & Telegraph Co., first pfd., "A" 6% pfd.	56½	60
Jamestown Telephone Corp., 5% cumulative, $100 par "A"	99¼	..
Jamestown Telephone Corp., participating pfd., $100 par	99¼	..
Keystone Telephone Corp., $4 cumulative, no par	21	24
La Crosse Telephone Co., 6% prior	96	99½
Lexington Telephone Co., 6½% prior	82½	85¼
Lincoln Telephone Co., 6% cumulative $100 par	105	107½
Lorain Telephone Co., 6% cumulative $100 par	99	102
Middle States Telephone Co., of Illinois 7%	94	97¾
Mount Vernon Telephone Co., 6% cumulative $100 par	90	93¾
Northern Ohio Telephone Co., 7% cumulative	98	101
Ohio Central Telephone Co., 7% first	48	53
Ohio Service Holding Corp., $5 pfd., $5 par	42¾	45½
Pacific Telephone & Telegraph Co., 6% $100 par	139	142½
Penninsular Telephone Co., 7% cumulative "A"	109	112
Pennsylvania Telephone Corp., 6% cumulative	107½	110
Rochester Telephone Corp., 6½% cumulative	110¼	..
The Southwest Telephone Co., 7%	1¼	3¼
Southwestern Bell Telephone Co., 7% cumulative pfd.	120¾	123½
Telephone Bond & Share Co., 7% first	34	37¾
Telephone Bond & Share Co., $3 first	25	..
Telephone Bond & Share Co., participating pfd.	12	..

Answers to Traffic Questions on Page 42

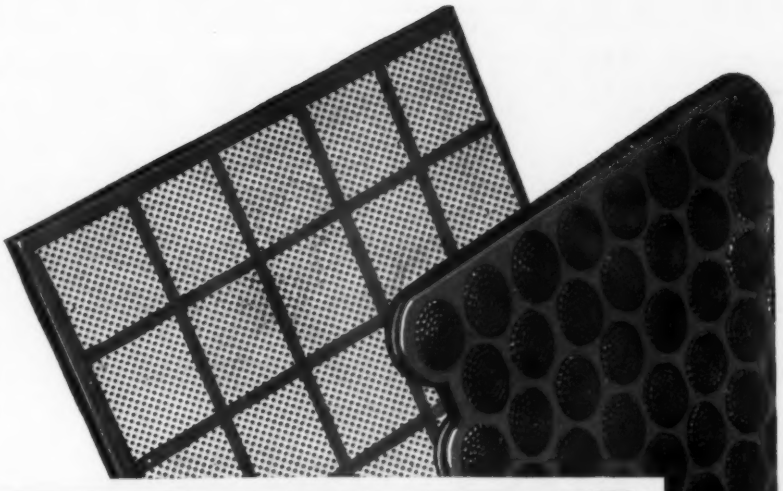
1. It remains a station-to-station call.
2. On a ringing clearance it saves the operator's time it formerly took for the intermediate operator to answer and for the OTC operator to pass the clearance. It requires the same amount of operator's time it formerly did in giving a "verbal" clearance.
3. If the operator knows in advance that she will require the charge on a call she should make this request at the time the call is placed. However, in many cases the customer does not request the charge until the finish of conversation.
4. Yes.
5. Accent is placed upon "you."

	Bid	Asked
Union Telephone Co., $1.70 pfd., $25 par	6	9
Warren Ohio Telephone Co., 7% $100 par	47	50
West Coast Telephone Co., 6% $25 par	21¼	23
Western Light & Telephone Co., $1.75 first, $25 par	22¼	24¾
Wisconsin Telephone Co., 7% $100 par	115¾	118
COMMON STOCKS		
American Telephone & Telegraph Co.	163	167
Associated Telephone & Telegraph Co., Class "A"	4½	6¾
Bell Telephone Co., of Canada	168	172
Central Electric & Telephone Co.	1¼	1¾
Empire Telephone Co.	6	8¼
Florida Telephone Corp.	10	17
General Telephone Corp.	14¾	18
Home Telephone & Telegraph Co., of Fort Wayne, $50 par	63	65½
Illinois Bell Telephone Co.	157	161
International Telephone & Telegraph Corp.	9	11½
Investors Telephone Co., $100 par	16½	19
Lincoln Telephone & Telegraph Co., Class "A"	35	37½
Middlewestern Telephone Co.	3¾	5
Mountain States Telephone & Telegraph Co.	139	143¼
New England Telephone & Telegraph Co.	118	121½
Northern Ohio Telephone Co.	68	..
Penninsular Telephone Co.	25	28¼
Telephone Bond & Share Co., Class "A"	3	5¼
Telephone Investment Corp., no par	45	48½
Western Light & Telephone Co.	1	1⅝

▼ ▼

Ohio Commissioner Prospect for High Court

Dennis F. Dunlavey, who recently was appointed to membership on the Ohio Public Utilities Commission, by Governor Martin L. Davey, has been mentioned along with several other prominent Democrats of the state, as a possible choice of the governor for appointment to the Ohio Supreme Court, to fill the vacancy occasioned by the death of Judge Thomas Jones.



emergency
INSURANCE

Like "true love" the operation of a telephone exchange does not always run smoothly. Unavoidable factors may frequently "upset the works". It is these disturbers of routine—*emergencies*—that test the real value of exchange equipment, especially storage batteries.

In any emergency, Exide Chloride Batteries can be depended upon to deliver their full capacity of power *when you need it most.* The operation of these batteries is not interfered with by fluctuations or interruptions of the normal supply of a.c. power. Throughout any contingency, Exide Chloride Batteries can be depended upon to help keep the majority of your lines in service.

Naturally, the value of such dependable service cannot be measured in dollars and cents; but, the economy which results from the many extra years of service which these batteries assure is a factor that can be figured. No matter what your telephone battery job, common battery, emergency reserve, signalling, P.B.X.—it will be done dependably and economically with Exide Batteries.

Exide
BATTERIES
FOR EVERY TELEPHONE USE

THE ELECTRIC STORAGE BATTERY CO., Philadelphia
The World's Largest Manufacturers of Storage Batteries for Every Purpose
Exide Batteries of Canada, Limited, Toronto

A Set of Extension Cords Which Will Prove a Worthwhile Investment. The Coils Shown to the Left Are Equipped, Respectively, With 500 and 300 Feet of Rubber-Covered Light Cord; the Coil Shown to the Right Is an Example of Short Extension Cords, Averaging from 30 to 50 Feet in Length, Which Are Found to Be Very Useful in the Telephone Exchange.

Plant Men Get Together

"I Wonder Why" of a Telephone Engineer

By Ray Blain

"I Wonder Why" more effort is not expended in providing and maintaining good light extension cords around the telephone exchange, when so much time can be lost due to the lack of them?

Good extension cords serve so many useful purposes that one cannot well afford to be without an adequate supply of them at all times. Extension cords have always been necessary, being frequently used for electric soldering irons and extension lights.

Due to the many portable electric tools which are coming into common use, their need is now even more frequent and urgent. For instance, we have an electric hammer drill, a large and a small electric speed twist drill, a portable electric planer and sander, a portable electric grinder and a paint spray. We use all of these tools frequently and to advantage.

To make use of these numerous tools on the job, extra long extension cords are sometimes a necessity; and to find a cord too short when in a hurry, does not generally lessen the use of linemen profanity—and in this day and age linemen are supposed to be refined gentlemen.

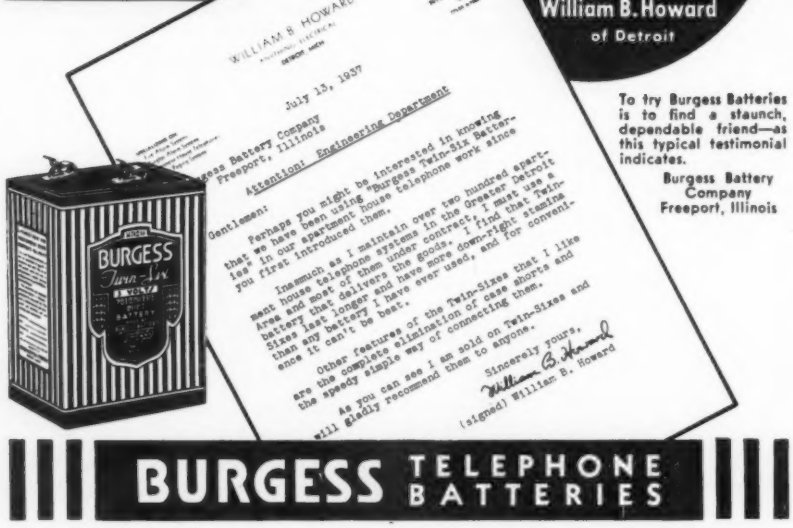
To overcome this common fault of cords being too short, we have developed extension cord reels which have proved a great success. These small, wooden reels have a two-gang socket mortised in the top and the inside end of the cord connected permanently to it. The other end of the cord is equipped with a rubber, male type plug.

The reel is placed in a position where work is to be performed and the wire is pulled out until the plug can be connected to the nearest live light socket. A length of cord as required can be used, with no danger of tangling, a real advantage in a long cord of this type. Short extension cords may now be plugged-in on the reel socket for the necessary light or tools.

Often when working in basements electric light as well as an electric tool will be required. The arrangement described eliminates the necessity for the use of two long extension cords under such conditions. We have two of these reels, one of which is equipped with 300 feet and the other with 500 feet of a good grade of rubber-covered, reinforced light cord.

These reels are shown in one of the accompanying illustrations. Another illustration shows two extension reels of a different type, the cord being wound on vertical spools. The reel to the left has a compartment in the base for carrying light bulbs and short lengths of cords.

"I AM SOLD on TWIN-SIXES —and will gladly recommend them to anyone" says— William B. Howard of Detroit


WILLIAM B. HOWARD
July 13, 1937
Gentlemen:
Perhaps you might be interested in knowing that we have been using Burgess Twin-Six Batteries in our apartment house telephone work since you first introduced them.
Inasmuch as I maintain over two hundred apartment house telephone systems in the Greater Detroit area and most of them under contract, I must use a battery that delivers the goods. I find the Twin-Sixes last longer and have more down-right stamina than any battery I have ever used, and for convenience it can't be beat.
Other features of the Twin-Sixes that I like are the complete elimination of case shorts and the speedy simple way of connecting them.
As you can see I am sold on Twin-Sixes and will gladly recommend them to anyone.
Sincerely yours,
(signed) William B. Howard
Burgess Battery Company
Freeport, Illinois
Attention: Engineering Department
BURGESS
Twin-Six

To try Burgess Batteries is to find a staunch, dependable friend—as this typical testimonial indicates.

Burgess Battery Company
Freeport, Illinois

BURGESS TELEPHONE BATTERIES

Our short extension cords, averaging from 30 to 50 feet in length, are equipped with a rubber male plug on one end and weatherproof sockets on the other. Cords of this size may easily

Two Extension Reels With the Cord Wound on Vertical Spools. The Reel on Left Has a Compartment in the Base for Carrying Light Bulbs and Cords.

be coiled by hand and we find them to be of sufficient length when used with the extension cord reels.

A set of extension cords of this type will be found a worthwhile investment in any telephone exchange.

▼ ▼

Some Safety Thoughts For Telephone Men

We are now at the season when different telephone and power companies do their pole line rebuilding. More accidents have been caused in doing pole line work and unloading poles than in any other type of work in the telephone and power fields.

Due to the hazards of this type of work we shall have to take special precautions, in order to prevent suffering to ourselves and our fellow workers. We have found, in unloading poles, that it pays to be careful. Don't allow spectators to hang around; this is not a good practice, regardless of what type of work you are engaged upon.

If you have a carload of poles to unload it is well to have an understanding as to where unloading operations are to begin. Chop the standards on one side where they are driven into the car until you have cut them about half through. Then go to the other side of the car and cut the wires that hold the standards. The standards on the side where they were cut will then break off and the poles will just about unload themselves.

Be sure to keep everyone in the clear and don't allow anyone on the side where the standards have been cut when the wire is cut on the opposite side. If, when the poles settle down and stop rolling, any are left on the car, it is then safe to put two men on the car with cant hooks.

Never let the men stand on top of the poles, for there is danger of poles rolling. Always have the men stand at the end of the car and use cant hooks in rolling the poles; never use the hands for this purpose.

Play safe and be a careful worker, for the only bank that pays 100 per cent—first, last and always—is the safety bank.

LAMAR, S. C. B. E. HARDIN.

▼ ▼

Old-Timer Encounters New Cause for Trouble

"In our 35 years of 'chasing trouble' we thought we had exhausted the new ones, but recently we added one more to the chapter. Our attention having been called to a most unusual noise on one of our garage subscribers' lines, we repaired to the rack to clean carbons, only to be met with a jolt from the electric circuit in no uncertain terms.

High line trouble was our next quest. As outside inspection did not reveal any cause for trouble, we hurried to the garage office where we found the following situation:

Mr. Garageman had installed a cheap electric fan without a start-stop switch, just above our generator box, for his desk telephone. Not having an electric outlet in his office, he had taken the fan cord, drawn it through the office partition and connected it to a plug in the garage part of the building.

To facilitate starting and stopping his fan, he had cut one of the electric cords and made a couple of hooks with the two cut ends, so he could reach up and make a barb wire connection and thus get his breeze. When he last made his disconnection, the live end of the wire curled up under our generator box, making contact with the screw holding the generator in the box, with the results already described. Maybe that was not a noisy telephone circuit."

A. E. WILCOX.
Bricelyn (Minn.) Mutual Telephone Co.

▼ ▼

Some Telephone Things I Didn't Know Until Now

By OSCAR WILL TELL

That a new development in automatic telephony is known as the "crossbar" switch.

That telephone subscribers in New York City dial for "time" information about 80,000 times daily.

That the 2,400-pair, lead-covered telephone cable is about 3.15 inches in diameter.

That the recording angel has a most difficult task when someone drops a slug into a pay station and gets a wrong number.

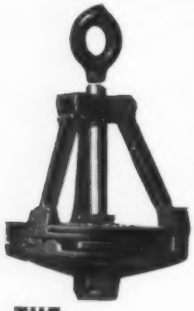
That a new message register camera has been developed which records readings of 25 message registers at one ex-

Reliable
SPLICING SLEEVES
MECHANICAL
MULTIPLEXING
INSULATION
Made in all sizes and combinations for copper and iron wire. . . . Reliable sleeves stand for the very best in double tube spliced joints.
Reliable
ELECTRIC COMPANY
OVER 25 YEARS SERVICE TO THE UTILITIES

THE SAFE ANCHOR
FOR R. E. A. CONSTRUCTION!

For long life and economy in annual maintenance costs, Everstick Anchors are first choice in rural electrification construction. Their safety and dependability have been proven on millions of miles of electric lines.

ANCHORS FOR EVERY PURPOSE



The complete line of Everstick Anchors offers three expanding types in a complete range of sizes and holding capacities. Also rigid type Cone Anchors in all sizes. Made of malleable iron with its properties of strength, elasticity and rust resistance. Write for new bulletin, "Everstick for Rural Electrification."

★

THE EVERSTICK ANCHOR CO. FAIRFIELD IOWA

STURGIS
TELEPHONE OPERATOR
POSTURE CHAIRS

No. 416-D

Here is one of many models designed for telephone operator use. Easily and quickly adjusted by hand to any size individual. Comfortable, up-to-date and durable.

ASK FOR DEMONSTRATION
Distributed by
STROMBERG-CARLSON TELEPHONE MFG. CO.
ROCHESTER, N. Y.
Manufactured by
Sturgis Posture Chair Co., Sturgis, Mich.

posure against only 10 of the old type camera.

That the present experimental coaxial cable system can transmit 20 groups in the frequency range 60 to 1020 kilocycles, employing a second modulation for 19 of the groups. This gives 240 channels. A similar coaxial provides the 240 opposite directional channels. Future developments will probably permit a greater number of channels.

That where the transcontinental telephone line crosses the desert west of the Great Salt Lake, in Utah, a strange apparatus, which looks like an old-fashioned fire engine, travels back and forth, fighting an enemy peculiar to the locality. That is the salt fog. These heavy fogs deposit large quantities of alkali on the glass insulators, causing serious transmission losses. So now, men ride across the desert regularly, towing a specially-designed steam boiler. At each pole, through pipes resembling fishing poles, jets of live steam are squirted around the insulators to clear away the alkali deposits. Such washing eliminates about 90 per cent of the transmission losses due to the alkali deposits.

▼ ▼

The Uneventful Life of a Trouble-Shooter

By Doc

The local managers of our telephone exchanges caused plant men considerable worry and trouble in the old days. The duty of the managers was to meet the public, sell service and make all collections. They did not, however, have supervision over the plant or traffic departments. But as they had the title of "Manager," the public generally thought they were the whole works, and many of them tried bravely to live up to their title.

This conduct generally caused considerable argument as the plant and traffic would become partners in crime, just to make it tough on the manager.

When he promised someone that he would have his men install a telephone without delay, he would ask the plant chief to have the work rushed. The plant chief, suspecting the truth, would generally delay the installation for some sufficient reason, such as "No cable facilities" or a similar good excuse, which could not be easily detected. We always derived real pleasure in showing-up the manager.

The manager at other times would promise a subscriber some peculiar, non-standard service before consulting the chief operator. That would likewise bruise her dignity, and she would make sure that her operators gave anything in the way of service except that promised by our manager. In those days no mere man ever won an argument with an operator, no matter what title he was authorized to carry.

I remember one time when instructions from company headquarters were issued that the manager would solicit new business. We had then reached what we innocently supposed was the telephone saturation point and practicaly every exchange in our territory was at a standstill.

Every afternoon our manager would stay out several hours. He claimed he was soliciting new business, but we suspected that he attended the ball game while we earned our pay by the sweat of our brow. On his return we always asked whom he had signed up, and he invariably answered: "I nearly got one." I actually believe that he never signed a single new unit, with all of his soliciting.

Many managers did not take the big "I" attitude, and naturally accomplished their desires by using a little common sense and diplomacy. When a subscriber asked them for anything special, they first consulted the plant chief or chief operator and obtained their cooperation before advising the subscriber.

This system was by far the better and created good feeling with all concerned. We had numerous lady managers in the smaller exchanges at that time and I do believe, everything considered, that they were more successful than men. We also had what we called "pro-rated managers," who were both plant chief and commercial manager. This was a most satisfactory arrangement in some type of exchanges.

The most colorful and successful manager I ever knew was an old chap down South with whom I worked intermittently over a period of about ten years. He had been a Texas Ranger and could shoot a rifle with more accuracy from the hip than I ever hoped to from the shoulder. He was fine, both as a man and a manager, and my association with him will ever remain a fond remembrance.

Our interdepartmental arguments in the old days were probably due to a great extent to a lack of proper system. There was really no reason why we should have had our frequent quarrels with continual ill feelings for each of us, and with the company which made our pay checks possible, as the real loser.

The exchanges of that size today, or at least the ones with which I am familiar, seem to exist without employes continually quarreling. It is good to see people working together in harmony for a common cause; to me it proves that the telephone art is really progressing in every way.

The Manufacturers' Department

New Development Engineer For Leich Electric Co.

The Leich Sales Corp., of Chicago, has announced the appointment of Harry H. Ide as development engineer of Leich Electric Co., of Genoa, Ill. Mr. Ide has been engaged in telephone development work for more than two decades and is responsible for many new developments in switchboard and telephone equipment.

HARRY H. IDE, For Many Years Active in the Development of Independent Telephone Equipment, Is Now Development Engineer of Leich Electric Co. With Headquarters at Genoa, Ill.

After 15 years of experience with the Kellogg Switchboard & Supply Co., Mr. Ide was with the American Electric Co. and Automatic Electric Co. for about eight years. He is a graduate of Purdue University, of the class of 1913, where he specialized in engineering.

▼ ▼

Appointed to New Positions With Graybar Electric

Kenneth B. Hopkins, assistant sales promotion manager of Graybar Electric Co., New York City, has been appointed assistant supply sales manager, in charge of street lighting materials, tools and solderless equipment with headquarters in Chicago. He will report to George F. Hessler, assistant general sales manager of Graybar.

Mr. Hopkins was first employed by the Graybar company in 1925, as a copy man in the advertising department. Four years later he was made assistant advertising manager. In that capacity he specialized in trade paper activities and cooperative work with many of the suppliers whose lines he will now supervise.

L. W. Taylor, formerly of the Graybar office at Columbus, Ohio, has also become a member of the assistant general sales manager's department. Mr. Taylor has been appointed assistant sales manager of the outside construction department, reporting to D. C. Guest who is sales manager of that department. Mr. Guest's headquarters are at the general offices of Graybar in New York City. Mr. Taylor will be located at the Chicago offices of the Graybar Electric Co.

▼ ▼

Good Service Restored with Nicopress and Sleeves

Ernest Sprague, manager of the Lake City (Mich.) Telephone Co., tells of a recent experience in eliminating noise on an iron wire rural line with the aid of a Nicopress tool, some galvanized iron sleeves and a comparatively small quantity of new wire, in a letter to the National Telephone Supply Co., at Cleveland, Ohio.

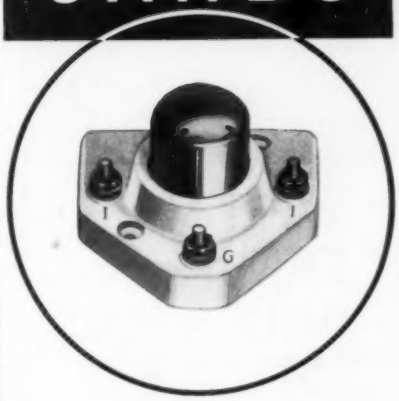
"We gave this tool and sleeves the hardest test there ever was," wrote Manager Sprague in describing the condition of the line and the circumstances of the test.

"Two miles of old No. 12 iron wire that had been up and in service for 15 years was taken down 15 years ago and placed alongside a 2,500-volt high tension line. The line was solid rust from beginning to end, with 150 single wire splices. The line was very noisy, working off a ghost phanton circuit, 13 miles to Central.

It was one day's work for three men to put the line in shape. The Nicopress did the job very nicely with 100 sleeves and 50 pounds of new wire. The result is a very quiet line, with very fine service."

Mr. Sprague, in his letter to the National company, also expresses his appreciation for the advertisement in TELEPHONY which made him acquainted with the Nicopress tool. He adds: "The Nicopress stays with the Lake City Telephone Co., as we have forgotten how to make the old kind of splices."

SANDS



TYPE 16 SUB-STATION ARRESTER

A compact, inexpensive substation arrester providing adequate protection where crosses with electric circuits are not likely to occur. Consists of two Type 2105 discharge blocks mounted in a heavy porcelain base and covered with a brass cap. Ask for more detailed information on this and other Sands protection equipment.

SANDS PROTECTION EQUIPMENT
Is Made by:

AUTOMATIC ELECTRIC COMPANY

Distributed by:
AMERICAN AUTOMATIC ELECTRIC SALES CO.
1033 West Van Buren Street, Chicago
Export Distributors:
AUTOMATIC ELECTRIC SALES COMPANY, LTD.
Chicago

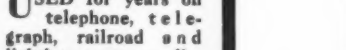
WHITALL TATUM INSULATORS

USED for years on telephone, telegraph, railroad and lighting company distribution lines . . . a dependable source of supply for uniform, well-designed transparent glass insulators.

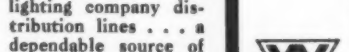
WHITALL TATUM CO.
Glass Manufacturers Since 1836
225 Varick St. New York

"ECCO" BRAND TELEPHONE WIRE

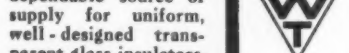
BRONZE DROP WIRE



BRONZE PARALLEL OUTSIDE WIRE



FLAME PROOF JUMPER WIRE



POTHEAD WIRE

INSIDE TELEPHONE WIRE

MADE BY HABIRSHAW DIVISION OF PHELPS DODGE COPPER PRODUCTS CORPORATION

DISTRIBUTED BY
STROMBERG-CARLSON
TELEPHONE MANUFACTURING CO.
ROCHESTER, N. Y.
CHICAGO, ILL. KANSAS CITY, MO.

Commission and Court Activities

FCC Examiner Approves Lake Radio Plan

The Federal Communications Commission September 3 received a recommendation from a commission examiner that Thorne Donnelley, Lake Bluff, Ill., be authorized to construct and operate a new coastal harbor telephone station at Lake Bluff.

Mr. Donnelley is seeking authority to construct a broadcast station which would operate unlimited time at Lake Bluff, Ill., on 2514 kilocycles with 700 watts power. Telephone communication to yachts and vessels on Lake Michigan would be established, he said, under a tentative agreement with the Illinois Bell Telephone Co.

Mr. Donnelley states that 300 vessels have agreed to take his service. He estimated that charges would be 75 cents for the first three minutes and 25 cents for each additional minute on ordinary calls. The person-to-person rate would be 90 cents for three minutes and 30 cents for each additional minute.

Mr. Donnelley's service would permit telephone calls from ships to any telephone in the United States connected with the Bell System.

▼ ▼

Pacific Bell Reduces California Handset Rate

The California Railroad Commission on August 31 announced that the Pacific Telephone & Telegraph Co. would reduce its monthly charges for handset telephones to 10 cents for a period of 12 months of continuous service, after which the charge would be discontinued. The reduction which becomes effective with the October 1 bills followed discussions of company officials with the commission.

Continuous service prior to October 1 will be credited and after that date continuous service will include handset service at any exchange of the company in the state unless there is a lapse of more than 30 days in transferring from one location to another. The 15-cent charge for customers who have had continuous service for 12 months or more prior to the date of this change will be entirely eliminated.

This is a further reduction in the handset rate since this rate was reduced on June 1, 1936, from 25 cents to 15 cents per month with the provision that the charge was eliminated after the customer had this service for a period of 18 months or more.

"This reduction in the handset rate," said President N. R. Powley of the Pacific company, "will effect a reduction in our gross revenues of $275,000 annually for the state of California and will be a substantial saving to the large number of our customers who have the handset instruments. While we look forward to the ultimate elimination of this charge, that step must be viewed in the light of the pronounced effect upon plant changes involving increased investment and increased operating costs, as well as on the effect of necessary rate level considerations.

"We believe, however, that it is in the public interest to lower the charge at this time; and we hope that the attractiveness of the new rate will promote a still larger use on the part of our customers, of the present high development of the handset.

Our operating expenses inclusive of taxes have been rising rapidly throughout the year, due largely to increased wages and increased taxes; and in accordance with our announced policy of paying just and fair wages and to meet these rising expenses, we hope our customers will find our rates so attractive and our service so ever-increasing in its value that telephone usage will be such that our revenues will, at all times, make it possible for us to meet our full responsibilities to the public we serve, our employes and those who have put their money in our business.

In accordance with our announced policy, we have been glad to participate in conferences with the commission rather than formal procedures, since we believe the conference method, conducted in a spirit of fairness, affords an opportunity to develop all pertinent facts and, in the long run, is a much more satisfactory basis for working out matters in the public interest than prolonged highly technical and controversial formal hearings."

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National Association Files Brief in Iowa REA Case

The brief of the United States Independent Telephone Association in the matter of the application of the Benton County Electric Cooperative Association, et al. before the Iowa State Commerce Commission, involving the division of expense necessary for the elimination of inductive interference on ground-return communication circuits, was filed with that body by Alfred L. Geiger, Washington, D. C., attorney for the national association on August 25.

The association's brief quotes rulings of a number of state commissions to show the economic justification for grounded lines and numerous court as well as commission rulings to sustain the association's position that electric cooperatives are liable for electrical interference, arising from both induction and conduction.

The conclusions set forth in the brief are as follows:

1. Grounded lines furnish reasonably adequate telephone service in rural areas, if not subjected to electrical interference.

2. Even though less modern, rural telephone lines constitute a property, the substantial interference with which constitutes a taking which will be protected by the law.

3. Only the telephone companies can determine when a community is prepared to bear the higher cost of service by means of full metallic circuits.

4. Telephone companies have been and should be protected in the use of the highways against electrical interference, except as against the paramount right of travel.

5. In most states, including Iowa, and in the federal courts, the first user enjoys the right of priority.

6. Electric cooperatives are liable for electrical interference, arising from both induction and conduction, even in the absence of negligence or faulty construction. No difference in the right of protection exists in induction and conduction cases, except that there is a duty on the telephone companies to minimize the damage to the best of their ability; but this duty does not preclude their right of recovery for the actual damage suffered where the damage is substantial and not incidental.

7. The doctrine of *damnum absque injuria* does not apply.

8. The proposed amendment to the Iowa rules should not be adopted.

Five Iowa REA cooperatives, in a brief filed with the Iowa State Commerce Commission, August 16, asked that body to rescind its 1916 rule providing for the compensation to telephone companies by electric power carriers because of inductive interference to grounded telephone lines.

The brief of the REA cooperatives, filed in support of their legal position as presented at a hearing before the Iowa commission, August 3, contends that the commission had no legal power or authority to make such a rule. Other points set forth in the brief were that the Iowa legislature had made no such grant of power to the commission and this 1916 rule was, therefore, unconstitutional.

The brief contends that the supreme courts of many states have held that there was no liability to a power com-

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As you want them
When you want them

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pany for inductive interference, that the telephone companies had no exclusive right to the highways because of prior occupancy, and that the commission should recognize the progress in the science of electricity and telephony and should not place a financial burden upon the REA projects to pay for the metallicizing of the grounded telephone lines.

The cooperatives ask the commission to rescind the rule complained of "to the end that the farmers of Iowa may have rural electrification and that this commission may act within the powers conferred upon it by the Iowa legislature and therefore within the law."

▼ ▼

FCC Counsel Killed with Wife and Son

Elmer D. Hays, assistant counsel for the Federal Communications Commission; his wife, their son and the youth's school chum died September 2 in a head-on collision of his automobile and a bus on the Philadelphia-Baltimore road a short distance from Baltimore.

The group was en route from Chevy Chase, Md., suburb of Washington, to Hanover, N. H., for the opening of the college year at Dartmouth.

Mr. Hayes died en route to a Baltimore hospital. His wife, Isabelle; their son, Elmer Hays Jr., 18 years old and James R. Leech, son of J. Russell Leech, a member of the Federal Board of Tax Appeals, were killed instantly in the crash.

State police said that the bus swerved in front of the Hays car in an effort to avoid collision with a truck which stopped suddenly.

▼ ▼

Rehearing Requested on Wisconsin Surcharge Plea

The Wisconsin Telephone Co. appealed September 4 to the Wisconsin Public Service Commission for a rehearing on the commission's recent order dismissing a plea for a 4.4 per cent surcharge on subscribers' bills following enactment by the legislature of an emergency tax on the telephone company, which amounts to about $533,014 annually.

In its request for a rehearing the company contended that the commission's refusal to permit the rate increase violated state and federal constitutions in denying the company the equal protection of the laws.

Moreover, attorneys for the company claimed that the commission's determination of the investment for furnishing various types of service is unlawful and unreasonable, that for a long time prior to the commission's order the company has found a 6 per cent return on property used and useful inadequate to produce a reasonable return and maintain company credit, and that the order is unreasonable, illegal, and void in denying the company written approval of the change in schedules, and thus compelling the company to furnish service at rates which are illegal, unconstitutional, and void.

The company contended, as well, that the commission failed to give due weight to the evidence of the company and that it did give undue weight and effect to the testimony of W. E. Baker, a commission accountant, whose testimony the company claims is immaterial and is not entitled to consideration as to the existence of an emergency.

The commission has not acted on the company's request for rehearing. By law it is entitled to 20 days in which to grant or deny rehearing. If at the end of that period, September 24, no action is taken on the company's request, it will be denied automatically.

▼ ▼

Rate Increase Certified by Commission Secretary

The secretary to the Ohio Public Utilities Commission on August 30 certified to the commission, to the prosecuting attorney of Mahoning County and to the Berlin Center Telephone Co. a report upon the application of the

OCTOBER 9

(Pre-Convention Issue)

OCTOBER 16

(Convention Report Number)

TELEPHONE COMPANIES will find these two issues of utmost interest. Advance news of the annual convention will appear in the October 9 issue; and in the October 16 number, a complete and accurate report of all convention activities will be published. Watch for these issues!

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company to increase its rates as follows: Business independent, $2.50 to $4.00 net per month; business two-party, $3.50; business rural, $2.50 to $3.50; residence independent, $1.75 to $2.50; residence five-party, $1.75; and residence rural, $1.50 to $1.75.

The company claimed that after appropriating $965.37 for depreciation, it earned $121.27 or a return upon a claimed valuation of $20,067.27 of .996 per cent under the present rates and that the proposed rates will produce a net income of $270.78 or a return of 1.4 per cent.

The commission's engineers appraised the property at $13,419.95 of which $12,168.51 is depreciable, recommend an annual allowance of depreciation of $608.43 and after making some adjustments in operating expenses develop a net income of $713.62 or a return of 5.31 per cent under the proposed tariff.

Under the law a period of 30 days is now allowed for the filing of objections to the report.

▼ ▼

Increased Rate Approved; Protests Overruled

Finding that the protests—which, "while preferring general objections, did not challenge any of the specific testimony offered tending to prove the insufficiency and inadequacy of existing revenues"—should be overruled and adopting the report, certified June 16 last, which concluded that the proposed tariff would produce an earning of but .077 per cent, the Ohio Public Utilities Commission on September 1 authorized the Citizens Exchange Telephone Co., of Hamler, to file, effective that date, a proposed new schedule which will increase the rates as follows:

Business independent, $1.75 to $4.00; business two-party, $1.50 to $3.50; business rural, $1.75 to $2.25; residence independent, $1.50 to $2.25; residence five-party, $1.25 to $1.75; residence rural, $1.25 to $1.75.

▼ ▼

Purchases Exchanges in Three Minnesota Villages

William Saltmarsh, who has for the past four years served as manager of the exchanges of the Central West Co. in the villages of New Market, Prior Lake, and Webster, Minn. has been authorized by the Minnesota Railroad & Warehouse Commission to purchase the properties described and operate them under the name of the Scott Rice Telephone Co.

Its order approving the sale and transfer of properties was handed down by the commission, August 10, after finding that the transfer would not result in the impairment of service. No consideration was given in this proceeding to the value or the price to be paid for the properties in question. The order specified that nothing shall be construed to be an approval of any increase in rates or diminution in service.

▼ ▼

Manager at Lonsdale, Minn., Purchases Local Plant

Frank W. Novak, who has served as manager at Lonsdale, Minn., telephone exchange for the past 17 years, was given permission by the Minnesota Railroad & Warehouse Commission, in an order handed down August 10, to

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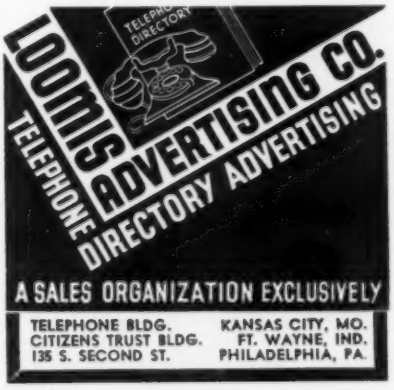
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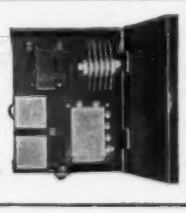


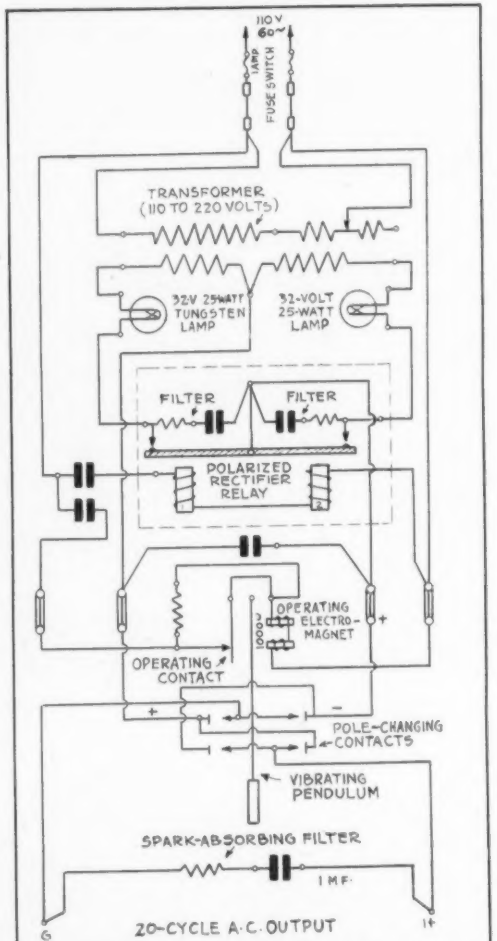


FIG. 79. EARLY TYPE OF KELLOGG RINGING MACHINE (SINGLE RELAY TYPE)

Theory and Practice of the Magneto Telephone Exchange—(Ctd.)

The initial rush of current through the vibrator coil attracts the steel reed towards the coil, which opens the contact points resulting in the immediate de-energization of the coil. The reed then swings back to its normal position and the contacts are closed. The vibrator coil is again energized and the operation is repeated, over and over.

The Telering Tuned Reed

The length of the thin flexible steel reed is so proportioned that the reed does not stop in its movement toward the vibrator coil the instant the contact is open. Due to its inertia, it will swing through an appreciable part of an arc before the resulting tension causes it to start to swing back toward the adjustable contact. In a similar manner when

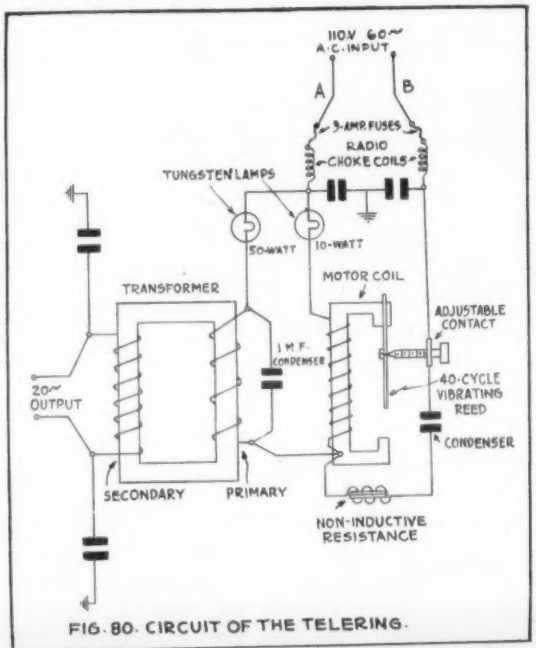


FIG. 80. CIRCUIT OF THE TELERING.

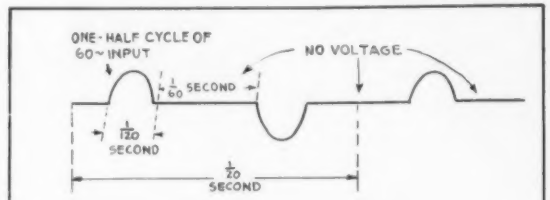


FIG. 81. OUTPUT WAVE OF TELERING MACHINE.

it strikes the contact, its inertia causes it to flex at the point of contact and the lowest portion of the reed will swing past its normal position.

The length of the reed is so proportioned that the contact is *open for 1/60th of a second* and *closed for 1/20th of a second*. The difference in time between the open and closed positions is due to the variation in the respective lengths of the reed when moving towards the vibrator coil and when moving away from the coil after the contact is closed.

A study of the complete cycle (Fig. 81) will show that it requires 1/40th of a second, which explains the reason for using a 40-cycle tuned reed. Let us see how the operation just explained results in a 20-cycle wave being made available for ringing purposes: Considering the effect of the opening and closing of the contacts, it is evident that each time the contact is closed, a half-cycle of the 60-cycle input alternating current is impressed across the primary winding of the output transformer. Due to the duration of the *open contact time*, which is 1/60th of a second, it is apparent that only every third half-cycle of the 60-cycle input wave will be impressed across the primary winding of the output transformer.

Referring to Fig. 81 it will be seen that this results in only two half-cycles, with a *no voltage gap* between, being impressed across the line in 1/20th of a second; in other words, we have changed 60-cycle current into 20-cycle current by deleting, by the means just described, a portion of our alternating current input wave at periodic points in the cycle.

The output wave is not a true 20-cycle wave as we ordinarily think of it; however, it has been found to be very satisfactory for ringing purposes.

narily think of it; however, it has been found to be very satisfactory for ringing purposes.

FIG. 80. CIRCUIT OF THE TELERING.

FIG. 79. EARLY TYPE OF KELLOGG RINGING MACHINE (SINGLE RELAY TYPE)

purchase the telephone properties in that village and the rural territory adjacent thereto from the Central West Company.

The commission found that the sale and transfer would not result in any impairment of service. In its order approving the transfer, it gave no consideration as to the value of the properties or the price to be paid therefor. Nothing in the order is to be construed as approval by the commission of any increase in rates or diminution in the service rendered.

▼ ▼

Two Competing Companies Want to Serve Jesse, Okla.

A conflict between two competing telephone companies for the right of maintaining service at Jesse, Okla., a Pontotoc county community of less than 300 inhabitants, where an oil boom is in prospect, reached the Oklahoma Corporation Commission August 19.

The commission was asked to issue a certificate of convenience to the Southwest Telephone Co., which maintains an exchange at Jesse and also serves Stonewall, about four miles away. The lines of the Fittstown Telephone Co., which has an exchange in the oil city of Fittstown, about 12 miles away, also extend into Jesse.

▼ ▼

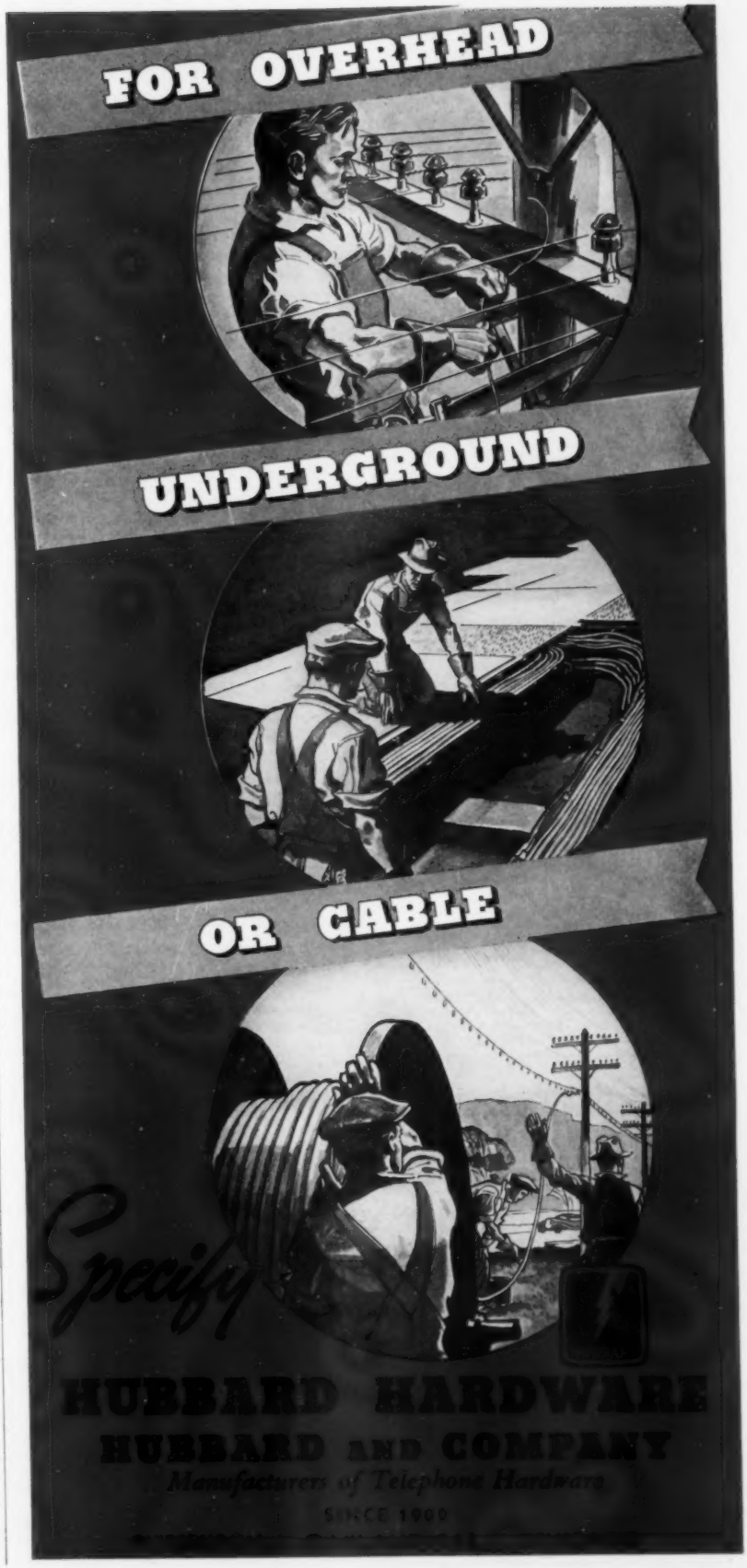
Numerical Directory Declared Infringement

The U. S. Circuit Court of Appeals, Ninth Circuit, handed down a decision in the case of Leon vs. Pacific Telephone & Telegraph Co., July 19, affirming the decree of the district court for the northern district of California, southern division, permanently restraining the infringement upon the copyright of the Pacific company's San Francisco and East Bay directories by a numerical telephone directory published by the appellant.

The district court had entered a decree permanently restraining the defendants from printing, publishing, selling, disposing of, etc., the infringing work; requiring the delivery for destruction of all copies of the numerical directory and all plates, molds, matrices or other means for making the directories, and awarding costs against the defendants.

According to the findings of the appeals court, the appellee, the Pacific Telephone & Telegraph Co. brought a suit in equity in the district court to restrain the appellants (Fred S. and Dagmar Leon) from infringement of appellee's copyright in the May, 1935, issues of appellee's San Francisco and East Bay telephone directories.

The bill alleged that the copyright



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Valentine Clark Corporation, 2516 Doswell Ave., St. Paul, Minn.—Finished Cedar Poles. Plain or butt-treated.

was duly issued covering these books and set out that the defendants had infringed it by publication of a "numerical telephone directory." That is to say, they had taken the information contained in plaintiff's alphabetical directory and published it in rearranged form, classifying it according to exchanges or prefixes, and listing the numbers under each exchange in numerical, consecutive order. The number was followed by the subscriber's name.

The court found, further, that copyrights on the directories at issue in this case were valid, and that the defendant had compiled, published and sold to the public numerical directories for San Francisco, Oakland, Berkeley, Alameda, and San Leandro, exclusively from the plaintiff's alphabetical directories.

As to "fair use" of the directories, the court held that "the fact that plaintiff has not chosen to arrange its material in the inverted form used by appellants is no determinant of fair use. The inversion, without license, is not permitted merely because the holder of the copyright has not so used it. This is settled by the case of Fox Film Corp. v. Doyal, 286 U. S. 123, where the supreme court said (127):

". . . . The owner of the copyright, if he pleases, may refrain from vending or licensing and content himself with simply exercising the right to exclude others from using his property."

Summary of Commission Rulings and Hearings

Federal Communications Commission
Washington, D. C.

August 23: Application filed with telephone division by the New England Telephone & Telegraph W O U Co., Green Harbor, Marshfield, Mass., requesting authority to communicate with Block Island in same manner as communication is carried on in the ship service; Block Island to operate on 2110 kilocycles, 5 watts.

August 23: Application for a wire certificate filed with the telephone division by the Pacific Telephone & Telegraph Co. requesting authority to modify existing order over a portion of the route between Weed, Calif., and the Oregon state line in order to shorten the route about eight miles.

August 24: Application for a wire certificate filed with telephone division by the Bell Telephone Co. of Pennsylvania requesting authority to supplement existing facilities between Newtown and Yardley, Pa., and between Doylestown and Pineville, Pa.

August 24: Application for a wire certificate filed with telephone division by the Diamond State Telephone Co. requesting authority to supplement existing facilities between Seaford and Georgetown, Dela.

September 13: Hearing before telephone division on the proposed new direct radiotelephone circuits to four major European countries by the American Telephone & Telegraph Co.

Alabama Public Service Commission

August 23: Hearing on petition of the Southern Bell Telephone & Telegraph Co. for authority to establish a dial system in Dadeville. The commission announced about 75 per cent of present customers had asked for the change, at slightly higher rates.

California Railroad Commission

August 31: The commission announced a reduction in the extra charge for handset telephones of Pacific Telephone & Telegraph Co. and associated companies. The reduction, which is expected to cut annual operating revenues by $275,000, will lower the extra charge to 10 cents monthly for 12 months, from 15 cents monthly for 18 months.

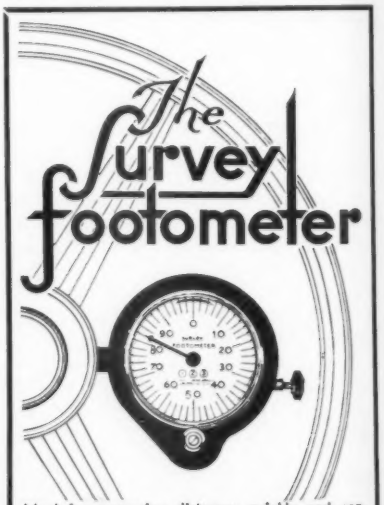
Illinois Commerce Commission

September 8: Hearing in Springfield on proposed new classification of accounts for Class A and B telephone companies.

September 8: Hearing in Springfield on the commission's citation, on its own motion, against the Young Telephone System, J. A. Young, owner, to show cause why telephone service should not be reestablished in the village of Glasgow.

September 8: Hearing in Springfield on complaint of the Kiwanis Club of Vienna, against the Illinois Commercial Telephone Co. as to telephone service and equipment in Vienna.

September 9: Hearing in Springfield on supplemental petition filed by the Illinois Bell Telephone Co. for authority to lease certain telephone facilities



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in Springfield from the American Telephone & Telegraph Co.

September 9: Hearing in Springfield on first supplemental petition filed by the Illinois Bell Telephone Co. for approval of lease of certain facilities in Peoria from the American Telephone & Telegraph Co. and cancelling rental agreement approved May 14, 1936.

September 10: Hearing in Chicago in the matter of proposed change in rates for telephone service stated in I. C. C. No. 1 section 1 original sheet No. 5 general local exchange tariff, telephone service I. C. C. No. 2 original sheet No. 1A, schedule of toll rates I. C. C. No. 2 original sheet No. 1A, rates for special contract service and I. C. C. No. 2 section 1 original sheet No. 6 teletypewriter exchange service tariff of the Illinois Bell Telephone Co.

September 10: Hearing in Chicago on citation of commission, on its own motion, against the Illinois Bell Telephone Co. to show why there should not be a reduction in rates for intrastate telephone service rendered by the company in the state of Illinois.

Nebraska State Railway Commission

September 15: Hearing on complaint filed by the Central Nebraska Telephone Co. of Grant against Chase County Telephone Co., the purpose of which is to compel the latter to cease operating a line between Champion and Lamar.

Ohio Public Utilities Commission

August 30: Secretary to commission certified a report to the commission, to the prosecuting attorney of Mahoning County and to the Berlin Center Telephone Co. upon the latter's application to increase its rates.

August 30: Pleading the necessity of additional revenue, the Mt. Vernon Telephone Corp. petitioned the commission for authority to increase its rates in Mt. Vernon.

September 1: Protests overruled and permission granted the Citizens Exchange Telephone Co. of Hamler to increase its rates.

September 2: The parties to the controversy having advised of their inability to amicably adjust the matter, the commission reassigned the hearing of the complaint of the Northern Ohio Telephone Co. against the alleged unlawful invasion of the Oberlin exchange area, for September 10.

September 28: Hearing scheduled in the state-wide Ohio Bell Telephone Co. rate case to consider the amount of refunds for the period of 1925-1932.

Oklahoma Corporation Commission

August 19: Certificate of convenience requested by the Southwest Telephone Co. for maintaining telephone service at Jesse where it operates an exchange. The lines of the Fittstown Telephone Co., of Fittstown, also extend into Jesse where an oil boom is in prospect.

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Copperweld Steel Co.	—
Crescent Tool Co.	2
Cuneo Press, Inc., The	1
Davey Tree Expert Co.	1
Do-More Chair Co.	—
Donnelley & Sons, R. R.	—
Electric Storage Battery Co.	45
Everstick Anchor Co.	48
Fansteel Metallurgical Corp.	—
Forged Steel Products Co.	—
Fort Wayne Printing Co.	1
Four Wheel Drive Auto Co., The	—
Fowle, Frank F.	53
Frankel Connector Co., Inc.	—
General Cable Corp.	—
General Electric Co.	—
Gould Storage Battery Co.	7
Gray Telephone Pay Station Co.	43
Graybar Electric Co.	—
Habirshaw, Division of Phelps Dodge Copper Products Corp.	50
Herdrich & Boggs	—
Hubbard & Co.	55
Illinois Telephone Association	8
Indiana Steel & Wire Co.	—
International Telephone & Telegraph Co.	41
International Creosoting & Construction Co.	56
International Harvester Co.	—
Jackson Lumber Co.	8
Joslyn Mfg. & Supply Co.	6
Kearney Corp., James R.	9
Kellogg Switchboard & Supply Co.	4-5-6-7
Kennecott Wire & Cable Co. (subsidiary of Kennecott Copper Corp.)	1-56
Kellems Products, Inc.	33
Kester Solder Co.	—
Klein & Sons, Mathias	44-58
Kraeuter & Company	—
Larkin Co., John C.	53
Leich Sales Corporation	—
Lenz Electric Mfg. Co.	—
Locke Insulator Corp.	—
Loomis Advertising Co.	53
Lorain Products Corporation	41
MacGillis & Gibbs Co.	56
Matthews Corp., W. N.	7
Michigan Pole & Tie Co.	—
National Carbon Co., Inc.	—
National Construction & Engineering Co.	53
National Telephone Supply Co.	6-60
Naugle Pole & Tie Co.	—
North Electric Mfg. Co., The	59
Oliver Iron & Steel Corp.	—
Owens-Illinois Glass Co., Hemingray Division	—
Page & Hill Co.	—
Partridge Lumber Co.	51-56
Philco Storage Batteries	12
Philips Electrical Works, Ltd.	—
Porcelain Products, Inc.	7
Porter, Inc., H. K.	—
Postal Telegraph Co.	41
Ray-O-Vac Company	42
Raytheon Mfg. Co.	6
Rebuilt Electric Equipment Co.	57
Reliable Electric Co.	47
Republic Creosoting Co.	—
Roebling's Sons Co., John A.	—
Russell, C. B.	53
Schauer Machine Co.	53
Schollhorn Co., The Wm.	—
Siemens Bros. & Co., Ltd.	39
Sigalet & Co., Ltd., H.	56
Speedometer Service Co.	56
Stewart Brothers	57
Stromberg-Carlson Telo. Manufacturing Co.	3
Sturgis Posture Chair Co.	48
Suttle Equipment Co.	—
Taylor-Colquitt Co.	—
Telephone Repair Co.	57
Telephone Securities Corporation	53
Telkor, Inc.	—
Union Carbide & Carbon Corp.	—
United States Independent Telephone Association	29
Unique Mfg. Co., Inc.	—
United States Steel Corp.	41
Valentine Clark Corporation	56
Western Electric Co.	—
Weston Electrical Instrument Corp.	—
Whitall Tatum Company	50
Whitney Blake Co.	—
Wopat, J. W.	1
Wray & Co., J. G.	53
Yale & Towne Mfg. Co., The	—
York-Hoover Body Corp.	—